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THE DEMAND FOR MONEY IN A FRAGMENTED ECONOMY: THE CASE OF TURKEY

A DISSERTATION

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THE CASE OF TURKEY

APPROVED BY

Benjamin J. Taylor

DISSERTATION COMMITTEE

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THE DEMAND FOR MONEY IN A FRAGMENTED ECONOMY: THE CASE OF TURKEY

CHAPTER I

INTRODUCTION

In economically less developed countries, an aim of the monetary authorities is to support government deficits through increases in the money supply. The justification of this official behavior is that the objective of the country is to meet the "legitimate" needs of "economic growth and development." As a result of this policy, the rate of increase in prices often averages to 20-25 percent or more annually. Price controls are periodically imposed to limit the ensuing inflation which dampens production of goods and services. The controls, in turn, cause many private enterprises to go out of business and State Economic Enterprises generate large operating deficits which are then financed through increases in the money supply. Controls add more fuel to the inflationary fire.[1]

For that matter, an understanding of the proper role of money in economic activity is important. In industrial countries the debate on the role of money has intensified in

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[1]Maxwell J. Fry, "Manipulating Demand for Money," in Michael Parkin and A. R. Nobay (eds.), Essays in Modern Economics (New York: Harper & Row Publishers, Inc., 1973), pp. 371-385.

recent years. Indeed, renewed interest in monetary economics is a feature of contemporary economics. The growth of empirical studies of monetary phenomena has been prodigious, and recent surveys of the field are voluminous. The result has been the modification and remodification of the theory of demand for money.

There have been a huge number of issues which have risen from theoretical and empirical works. Some of these issues are related to the proper specification of the money demand function such as the use of income vs. wealth variables or the rationale for using lagged responses. Furthermore, there are other issues which center on the properties of the estimated demand functions such as speed of adjustment and stability. In short, ideas on the subject vary widely.[1]

The problem is one of defining money in a fragmented economy, where the development of the capital market is poor and thin, so that a stable demand function can be shown to have existed over time under different institutional structures and different social and political environments.

The theory of demand for money usually assumes that the nominal supply of money is given and predetermined by governmental activities. A view of this study is that a predetermined amount can be clarified through investigation of a time series of the demand for money. Theoretical

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[1]David E. Laidler, The Demand for Money: Theories and Evidence (New York: International Textbook Company, 1969), pp. 39-43.

debates and hypotheses are the beginning of the investigation of the form and character of the demand for money functions which must be supported by empirical research .

Contributions of the Study

In this undertaking, an examination of monetary behavior is made under a divergent social, political and economic structure by exploring empirically the demand for money function for a fragmented economy--Turkey.

It is expected (to some extent) that this analysis will contribute further understanding and knowledge of the demand for money side in a variant institutional structure and monetary policy of a fragmented economy such as the Turkish economy.

The Purpose of the Study

The objective of this undertaking is two-fold: first of all, the aim of the study is to deal with the history and methodology of the demand for money. Then a summary of the recent theoretical and empirical studies is made to provide a further test of the validity of hypotheses by applying them to the experience in Turkey.

Secondly, it is the objective of this undertaking to employ the money demand hypothesis to estimate a demand function for money in Turkey in order to gain insights into the general functioning of the monetary system of the Turkish economy. The purpose of this attempt is to gain a better

understanding of the institutional structure and governmental policy related to the monetary sector of the economy. However, particular attention is given to the following interrelated questions:

(a) Is the relationship between demand for money and important variables a stable one over time? Are the factors which determine the demand for money, with special references to real income and rate of change in price level, causing systematic long-run shifts or short-run instabilities in the demand for money function which loses its predictive power?

(b) What kind of assets are going to be called "money?" Is the stock of "money" or the stock of money plus quasi-money going to be included in the definition of "money?"[1]

The Rationale for the Study

The answer to the above questions vary in quality. A present stumbling block in testing hypotheses about economic phenomena is that it is hopeless to hold "other things equal" and analyze one behavior relationship at a time. However, by incorporating the main institutional structure and workable characteristics of a fragmented economy, an investigation of monetary phenomena will provide some perspective in analyzing the nature and consequences of different policies in the realm of money. It is intended that this research will lead to an appreciation of theoretical and institutional questions and increased understanding

[1]Ibid., p. 89.

of the workings of the system. Some policies are detrimental to the system and through chain reaction lead to further interventions with the hope of rectifying it, which eventually endangers the functioning and productivity of the economy.

The Hypotheses to be Tested

The hypotheses of this study are:

H_1 There is a demand for money which is stable over time, and dependent upon a few key economic variables such as income and the rate of inflation.

Secondly, the hypotheses will be tested according to different definitions of money such as M_1 and M_2, and to different definitions of income such as measured and permanent income.

For these hypotheses, statistical tests of significance are applicable.

The Model

The demand for money hypothesis for a fragmented economy has the following relationship:

$$(1)\quad (M/PN)^d = a_o\,(Y_{P/PN})^{a_1}\, e^{-a_2 \dot{P}E}$$

where: $(M/PN)^d = m$ = per capita desired demand for real cash balances,

M = nominal desired money balances

P = price level

N = population

$Y_{P/PN}$ = per capita permanent real income

Y_P = permanent nominal income

$\dot{P}E$ = expected cost of holding money, the expected rate of price change

a_1 = income elasticity of demand for money

a_2 = coefficient of rate of inflation[1]

In equilibrium we have,

(2) $M^d = M^s$

(3) $M^s = M$

Hence we can write the following equation:[2]

(4) $M/PN = a_o \, (Y_{P/PN})^{a_1} e^{-a_2 \dot{P}E}$

Taking natural logarithms, equation (4) becomes

(5) $\ln m = \ln a_o + a_1 \ln Y_P - a_2 \dot{P}E$

where: $M/PN = m$

$Y_{P/PN} = Y_P$

For empirical purposes Y_P and $\dot{P}E$ are not observable variables and are not operational in empirical studies.

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[1] a_2 is the percentage change in demand with respect to arithmetic changes in the rate of inflation (measured as percent per annum). Cagan and Schwartz define a_2 as the slope of the demand curve. See Phillip Cagan and Anna J. Schwartz, "Has the Growth of Money Substitutes Hindered Monetary Policy?," Journal of Money, Credit and Banking, Vol. VII, No. , May, 1975, pp. 137-159.

[2] Cagan makes the same assumption by stating "that real cash balances are equal to actual real cash balances at all times." Cagan, "The Monetary Dynamics of Hyperinflation," Studies in the Quantity Theory of Money, ed., M. Friedman (Chicago: University of Chicago Press, 1958), p. 33; and Feige suggests that ". . . cash balance portfolio adjustments to desired positions are completed within a single year." Edgar L. Feige, "Expectations and Adjustments in the Monetary Sector," American Economic Review, Vol. 57, No. 2, May, 1967, p. 471.

This study will follow the procedure of Friedman's methodology of permanent income which is:

$$(6)\quad Y_p(T) = \beta \int_{\infty}^{T} e^{(\beta-\alpha)(t-T)} y(t)\,dt$$

where $Y_{p(T)}$ = expected income at time T and is equal to a weighted average of past incomes, adjusted for secular growth at the rate of α percent per year, where the weights decline exponentially and equal to $e^{\beta(t-T)}$, t being the time of the observation which is being weighted.

The numerical value of β was estimated to be .4; of α, .02 for the consumption function.[1] However, in the estimation of demand for money function for the United States α has the value of .033.[2]

The equation (6) can be rewritten as:[3]

$$(7)\quad Y_P(T) = \sum_{i=0}^{\infty} \beta(1-\beta)^i (1+\alpha)^i y_{T-i}$$

Following Cagan and Deaver, we can state that $\dot{P}E$, the expected rate of change in prices is a weighted average of past rates of change given by the exponential function.[4] The expected change in $\dot{P}E_t$ is revised in proportion to the

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[1]Milton Friedman, A Theory of the Consumption Function (Princeton University Press, 1957), pp. 142-154; and Milton Friedman, "The Demand for Money: Some Theoretical and Empirical Results," Journal of Political Economy, Vol. 67, No. 4, August 1959.

[2]Dr. Liew's lecture notes for the Spring 1976 semester in Macroeconomics.

[3]Carolyn Clark, "The Demand for Money and the Choice of a Permanent Income Estimate: Some Canadian Evidence, 1926-65," Journal of Money, Credit and Banking, Vol. 5, No. 3 (August 1973), 772-793.

[4]Cagan, "The Monetary Dynamics of Hyperinflation," p. 39.

fulfillment of price expectations in the previous period. The general formula is derived as follows:

$$(8)\quad \dot{PE}_t - \dot{PE}_{t-1} = \beta(\dot{P}_{t-1} - \dot{PE}_{t-1}),\ 0<\beta<1$$

where β is the coefficient of price expectation. This technique assumes the following geometrically distributed lag, which, is the reformulation of (8):[1]

$$(9)\quad \dot{PE} = \sum_{i=0}^{\infty} \beta(1-\beta)^{i} \dot{P}_{t-i}$$

By substituting (7) and (9) into equation (5), we obtain the following:

$$(10)\quad \ln m = \ln a_o + a_1 \ln \{\sum_{i=0}^{\infty} \beta_o(1-\beta_o)^{i}(1+\alpha)^{i} y_{T-i}\}$$

$$- a_2 \{\sum_{i=0}^{\infty} \beta_1(1-\beta_1)^{i} \dot{P}_{t-i}\}$$

In applying equation (10) with the assumption, $1 > \beta_i > 0$ and by trying out different β's, we can be able to construct the associated y_P and $\dot{PE}$ series and choose the β which gives the highest R^2 and "is regarded as most nearly reflecting aggregate expectations of how rapidly prices will rise,"[2] and in turn its effect on the demand for money.

In empirical estimation of permanent income and expected rate of inflation, the value of β is changed from

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[1] Deaver, "The Chilean Inflation and the Demand for Money," The Varieties of Monetary Experience, ed. David Meiselman (Chicago: University of Chicago Press, 1970), p. 29.

[2] Ibid., p. 26.

zero to 1 till a higher R^2 is obtained in equation (10). The value of α is .062 which is the average annual increase in real income between 1950-1976. By changing values of β's, different permanent income and expected rate of inflation series are obtained with equation (7) and (9), respectively. These different series of permanent income and expected rate of inflation, then, are used as independent variables in equation (10).

In an economy in which approximately 86 percent of the Gross Domestic Product is currently consumed, then the actual measured income and the actual rate of price change become important variables in estimating the demand for money in a fragmented economy "because the expected rate of inflation should normally be below the actual rate during periods of accelerating inflation if the expected rate of inflation is a distributed lag function of past inflation.[1] In other words, the impact of real income and rate of inflation, $\dot{P}$, on the demand for money equation is estimated to find out their importance in our analysis.

The Methods of Estimation

In this study, most of the estimation procedure will follow the methods used by Cochrane-Orcutt (CORC) and Hildreth-Lu (HILU) in order to reduce the effects of the

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[1] J. J. Paunio and Antti Survanto, "Changes in Price Expectations: Some Tests Using Data on Indexed and Non-Indexed Bonds," Economica, Vol. 44, No. 173, February 1977, pp. 40-41.

first order serially correlated errors in the equations.[1]

Cochrane-Orcutt procedure uses an ordinary least squares regression to form an initial estimate of rho, the first order serial coefficient. Using this initial guess of rho, then the following iteration occurs:

- all data are transformed by rho (e.g., $X_t - \hat{\rho}X_{t-1}$)
- regression is run on transformed data
- the regression coefficients are multiplied into the original independent variables to recalculate the serially correlated errors
- a new estimate of rho is formed.

The entire process is repeated until rho changes from one iteration to the next by less than critical value, .005, or when 20 iterations have occurred, then the process of iteration terminates and output is produced.

Hildreth-Lu maximum likelihood scanning procedure selects the value of rho which results in the lowest transformed error sum of squares and outputs the associated regression. These processes provide a Durbin-Watson statistic in reasonable range, in which no serious autocorrelation exists.

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[1]D. Cochrane and G. H. Orcutt, "Application of Least-Squares Regressions to Relationships Containing Auto-correlated Error Terms," Journal of the American Statistical Association, Vol. 44, pp. 32-61, 1949; C. Hildreth and J. Y. Lu, "Demand Relations with Auto Correlated Disturbances," Technical Bulletin 276, Michigan State University, Agricultural Experiment Station, November 1960.

In the estimation of regressions, Time Series Processor, revised version (October 1977) of Harvard University and Econometric Software Package (May 1973) of University of Chicago are used.[1]

Sources of Data

The Money Data

The annual data consist of a set of basic series (currency outside banks, demand and time deposits and other quasi-money deposits at the banks). The basic series consist of annual end-of-year figures based on central bank publications. Main sources for money supply data are Annual Report of Central Bank of Turkey for the years 1970-76 and Monthly Bulletin of the Central Bank, January-February 1977.

The Price Data

For Turkey we have different price estimations by different departments. However, the best consistent data on price indices is estimated by the State Institute of Statistics, that is the implicit price deflator of Gross National Product for the years 1948-76. For comparison, other price indexes will be studied such as wholesale price index by the Ministry of Commerce reported in International Financial

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[1]Browyn H. Hall, Time Series Processor, second version (Harvard Institute of Economic Research, Harvard University, Cambridge, Massachusetts), pp. D.4.1-D.4.3; and J. Phillip Cooper, Econometric Software Package (University of Chicago, Graduate School of Business, Chicago, Ill.), p. B.8.

Statistics. All the price indexes reported in this study suffer from continuous government price controls. The controls, however, are not able to decrease 20-25 percent rate of inflation per annum even though the price indexes are calculated with large weights attached to official prices set by law. In reality the actual rate of inflation is probably considerably understated. For this reason the GNP Implicit Price deflator is the best indicator of the reduced purchasing power of money. Data for the 1948-1976 is obtained from National Income and Expenditure of Turkey (1948-1972), National Income and Expenditure of Turkey (1962-1973), and later estimates of State Institute of Statistics reported in Annual Report of Central Bank of Turkey for the years, 1973-1976.

The Income Data

The annual figures for the Gross National Product are taken from National Income and Expenditure of Turkey (1948-1972), National Income and Expenditure of Turkey (1962-1973), and Annual Report of Central Bank for the years 1973-1976, all estimated by the State Institute of Statistics.

The Outline of the Study

This study is one of the attempts to study the role of demand for money in a fragmented economy such as Turkey in which financial development is relatively inefficient and

very costly. The study is divided essentially into four parts. The first part is the introductory chapter. It introduces the hypotheses to be tested, proper methodology and relevant techniques of this study.

A concise survey of historical development of literature summarizing the various money demand hypotheses is provided in the second chapter.

In the third, the institutional arrangements, general policies, financial structure, and the problem of defining appropriate empirical counterparts for the variables of the statement is presented.

In the fourth chapter, the empirical behavior of demand for money is estimated and analyzed. The results and conclusions of the empirical portion and its implications are summarized. This is followed by the Appendices and Bibliography.

CHAPTER II

THE DEMAND FOR MONEY: A THEORETICAL APPROACH

One of the crucial issues both in monetary economics and the debate over the importance of monetary policy affecting the key variables in the economy is the stability of a functional relationship between money and important economic variables. The meaning and importance of a stable demand function for money has been a cornerstone of modern macroeconomics and has been subjected to considerable empirical analysis.[1] The stability of this functional relationship has been examined and the evidence in support of a stable demand function has been "overwhelming."[2] The importance of these findings for a stable monetary policy consistent with stable prices cannot be overemphasized as it was indicated

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[1]For a review of this research see the surveys and articles by David E. Laidler, The Demand for Money: Theories and Evidence (New York: International Textbook Company, 1969); J. T. Boorman, "The Evidence on the Demand for Money: Theoretical Formulations and Empirical Evidence," in J. T. Boorman and T. M. Havrilesky (eds.), Money Supply, Money Demand and Macroeconomic Models (Boston: Allyn and Bacon, Inc., 1972), pp. 248-291; S. M. Goldfeld, "The Demand for Money Revisited," in Brookings Papers on Economic Activity 3 (1973), pp. 577-638.

[2]M. S. Kahn, "The Stability of the Demand-For-Money Function in the U.S., 1901-1965," Journal of Political Economy, Vol. 82 (November/December, 1974), pp. 1205-1219.

that "the stability of the money demand function, together with a capacity on the part of the monetary authority to influence closely the stock of assets corresponding to the theoretical concept of money employed in that function would seem to be necessary conditions for the successful implementation of monetary policy."[1]

The empirical testing of the theory of demand for money in the development of the monetary economics is a recent phenomenon. In order to understand the "new" approach, this chapter begins with the brief review of some stages of this development. After a brief historical survey of the monetary economics, three of the most significant approaches are analyzed.

The first approach to the theory of demand for money is the transaction and speculative demand for money. This approach analyzes the demand for money as an asset alternative to other assets in the development of Keynesian monetary theory.

The second approach is the neo-classical approach to estimating demand for money. It emphasizes permanent income as the primary determinant of the demand for money. This approach assigns the primary importance to the application of general demand theory to money.

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[1]J. T. Boorman, "The Evidence on the Demand for Money: Theoretical Formulations and Empirical Evidence," in J. T. Boorman and T. M. Havrilesky (eds.), Money Supply, Money Demand and Macroeconomic Models, pp. 250-251.

The third approach to the demand for money is Deaver, Adolfo Cesar Diz and Cassuto's approach--a method that will be used in this undertaking for a fragmented economy.

The Nature and Functions of Money

The controversy about the nature and functions of money was so great that in 1911 Irving Fisher was led to call it "scandal" that there is no agreement among the academic economists "over the fundamental propositions concerning money" because of "outside clamor."[1] Moreover, there has been disagreement throughout history to the present day on the most fundamental of questions--what is money? What is the essential property that differentiates money from other goods? Is it a part of wealth of nations? Why do people try to hold money? Even at present, it is wrong to think we have consensus of opinion about the theory and practice of money. In the words of one economist, "Money remains a bone of contention."[2]

However, money is an essential instrument of economic organization in a society which has advanced from a nomadic way of life to that of a sedentary way of life. Nevertheless, economists like Von Mises state that "the phenomenon of money presupposes an economic order in which production is based

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[1]Irving Fisher, The Purchasing Power of Money (New York: Macmillan, revised edition, 1920), p. VIII.

[2]A. A. Walters, "Introduction: Money and the Economy," in A. A. Walters (ed.), Money and Banking (London: Penguin Books Ltd., 1973), p. 7.

on division of labor and in which private property consists not only in goods of the first order (consumption goods), but also in goods of higher orders (production goods)."[1] Mises believed in the need for the existence of money and stated that we have to have free exchange of goods and services and the existence of private property. Where we have no private property and free exchange, then there is no need for money.[2] However, we can assert that the more the society becomes complex, the more the need for money appears because the lack of complete information necessitates the use of money even in a centralized economy. Hume succinctly concluded that money is "only the instrument which men have agreed upon to facilitate the exchange of one commodity for another."[3]

Ibn Khaldun, a fourteenth century economist, indicates that the quantity of money is of no significance for a country's wealth.[4] John Locke (1623-1704) and David Hume (1711-1776) arrive at the same conclusion. Adam Smith

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[1]Ludwig Von Mises, The Theory of Money and Credit, translated from the German by H. E. Batsun (New York: The Foundation for Economic Education, Inc., 1971), p. 29.

[2]Ibid., pp. 28-31.

[3]David Hume, Writings on Economics, edited with an Introduction by Eugene Rotwein (Madison: The University of Wisconsin Press, 1970), p. 33.

[4]Ibn Khaldun, "The Muqaddimah": An Introduction to History, translated from Arabic by Franz Rosenthal, 3 vols., Bollingen series no. 43 (New York: Pantheon, 1948), Vol. II, pp. 245, 246, 285.

states that people hold money because of "convenience."[1] And it is necessary to provide money to further that "convenience" for trade. Ibn Khaldun and Hume understand that a large stock of precious metals is important for the government because with its mercenary troops can be hired, but for trade, in Hume's words, it is only "the oil which renders the motion of the wheels more smooth and easy."[2]

About the property of money, Irving Fisher says that "any commodity to be called "money" must be generally acceptable in exchange, and any commodity generally acceptable in exchange should be called money."[3]

However, most economists agree that for a good to be money it has to perform four or five functions:

1. Money is a medium of exchange which increases specialization, minimizes the cost of transaction, generalizes the purchasing power and as a consequence facilitates exchange.

2. Money is a store of value, an asset, which is not demanded for itself but for the fact that it can be used to purchase other goods.

3. Money provides a standard of value in which all other values are measured.

4. Money is a standard for deferred payments, which makes it possible to transfer the purchasing power

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[1]Vincent Bladen, From Adam Smith to Maynard Keynes: The Heritage of Political Economy (Toronto: The University of Toronto Press, 1974), p. 58.

[2]David Hume, p. 33.

[3]Irving Fisher, Purchasing Power of Money, p. 2.

from one person to the other.[1]

5. "Money is the most liquid of all 'liquid assets.'"[2]

Advantages of a Monetary Economy

We have witnessed the use of barter throughout history. However, the advantages of a monetary economy over a barter economy are:[3]

a) to avoid a double coincidence of wants;

b) to enable separation of sale of one object and purchase of another;

c) to allow the specialization of factors of production;

d) to minimize the cost of information; and

e) to increase efficiency.

The monetary system, in which there is a generally acceptable medium of exchange, reduces the costs involved in economic activity and generates greater convenience. The reason why money is used in a monetary economy is because it is more efficient to organize exchange in this way rather than using the barter arrangement. If a monetary economy could become costly because of money instability, people would switch to barter if they thought their gain would be greater. Even, with a high rate of inflation, some would try to minimize their cash holdings, but they would not get rid of it

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[1]W. Nelson Peach, Principles of Economics (Homewood, Ill.: Richard D. Irwin, Inc., third edition, 1965), pp. 183-192.

[2]A. A. Walters, "Introduction: Money and the Economy," in A. A. Walters (ed.), Money and Banking, p. 7.

[3]Ibid., pp. 7-10.

completely because avoiding double coincidence of wants is less costly than the barter arrangement.[1]

The Demand for Money: A Historical Approach

The ideas about money and its effect on the economy have been with us since money has become a medium of exchange. Philosophers have written essays and books on money. Some of the ideas have been forgotten and some of them, after a period, have been "rediscovered."

We see the presentation of quantity theory by Locke and many others. However, the most systematic dynamic analysis of the theory is found with Hume, Wicksell and Irving Fisher.[2]

Irving Fisher

Irving Fisher was interested in "the principles determining the purchasing power of money" and the dynamic analysis of a monetary economy. He was aware of the role of money on the individual's behavior, on output and other variables such as prices and interest rates. In other words, he was not a "naive" monetarist.

He understood the short run and long run implications of money on the economy. If we double the money, this did not mean the prices would double and nothing would happen to output and interest rates. This is what he says about the

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[1] Cagan, "The Monetary Dynamics of Hyperinflation"

[2] H. Visser, The Quantity of Money (New York: John Wiley and Sons, 1974), p. 136.

quantity theory:

> The so-called "quantity theory," i.e., that prices vary proportionately to money, has often been incorrectly formulated, but (overlooking checks) the theory is correct in the sense that the level of prices varies directly with the quantity of money in circulation, provided the velocity of circulation of that money and the volume of trade which it is obliged to perform are not changed.[1]

If we read these sentences correctly, we do not see a strict proportionality in a mechanical sense. However, Irving Fisher was the one who stated the quantity theory in the form of the equation of exchange, $MV = \Sigma PO = PT$, where M is the average quantity of money, V is the velocity of transactions, P is an average of all prices, O is the total quantity of goods purchased, and T is an aggregate of all goods and services that change hands over a given time period. Fisher's formulation of the equation of exchange is more comprehensive than the income version, since T includes all intermediate, final and financial transactions. The Fisher equation of exchange can be expressed in words as the total quantity of money times its velocity is equal to the total value of transactions.

Fisher states that "the velocities of circulation of money and of deposits" are affected by these changes:

1. Habits of the individual

    a. As to thrift and hoarding
    b. As to book credit
    c. As to the use of checks

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[1]Irving Fisher, Purchasing Power of Money, p. 14.

2. Systems of payments in the community

   a. As to frequency of receipts and of disbursements
   b. As to regularity of receipts and disbursements
   c. As to correspondence between times and amounts of receipts and disbursements

3. General Causes

   a. Density of population
   b. Rapidity of transportation[1]

These determinant variables of velocity are stable and change with changes in the institutional structure in the long run with the exception of thrift and hoarding which "tends to decrease" or increase "the velocity of circulation."[2] Moreover, the rate of increase or decrease in prices and interest rates also affect the velocity of circulation.

If we count the demand deposits, M' and average velocity of circulation of checks, V' into the equation of exchange, then the equation of exchange becomes:

$$MV + M'V' = \Sigma pO = PT$$

The rest of the definitions keep their previous definition.[3]

Fisher implicitly postulated that the demand for money is a function of trade. Then, the aggregate demand for money by the economy is a function of volume of trade.[4] Moreover, if we have a high rate of inflation or deflation, the

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[1]Irving Fisher, Purchasing Power of Money, p. 79.

[2]Irving Fisher, Purchasing Power of Money, p. 80.

[3]Ibid., p. 48.

[4]David E. W. Laidler, The Demand for Money: Theories and Evidence (New York: International Textbook Company, 1969), p. 47.

demand for money has to be affected. In other words, the rate of prices is another function in the demand for money. Fisher notices the dynamic nature of a monetary economy on the behavior of the individual. The effect of the rise in prices on the individual demand for money is stated as follows: ". . . the rise in prices--fall in the purchasing power of money--will accelerate the circulation of money. We all hasten to get rid of any commodity which, like ripe fruit, is spoiling on our hands. Money is no exception; when it is depreciating, holders will get rid of it as fast as possible."[1]

The analysis of Fisher "implies that the demand for money is a real demand."[2] Fisher applied the demand concept explicitly to money with testable implications.[3]

Furthermore, we see the development of a dynamic approach to the effect of money on the economy, expectations and other variables. He states that if the supply of money increases, this "may exert a psychological stimulus on trade, though a few unemployed may be employed, and some others in a few lines induced to work overtime," but this will cause a series of changes in the economy such that:

1. Prices rise.
2. Velocities of circulation (V and V') increase; the

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[1]Irving Fisher, Purchasing Power of Money, p. 63.

[2]Harry G. Johnson, Macroeconomics and Monetary Theory (Chicago: Aldine Publishing Company, 1972), p. 60.

[3]Irving Fisher, The Money Illusion (New York: Adelphi Company, 1928), pp. 45-54.

rate of interest rises, but not sufficiently.

3. Profits increase, loans expand, and the 0's increase.
4. Deposit currency (M') expands relatively to money (M).
5. Prices continue to rise.[1]

All these changes, states Irving Fisher, "are temporary changes, pertaining only to the transition period."[2] In other words, the use of monetary policy to obtain a trade off between unemployment and inflation is a temporary phenomenon. Such a policy is inoperational and dangerous in the long run since it causes the expectations of increasing prices and exerts pressures on individuals to get rid of their cash holdings as soon as possible.[3]

Von Mises

Mises is another economist who has made an attempt to formulate the demand for real cash balances in terms of both the transactions and precautionary motives, motives that depend on "the subjective valuations of individuals."[4]

Mises states that "for every variation in the quantity of money introduces a dynamic factor into the static economic

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[1] Irving Fisher, Purchasing Power of Money, pp. 62-63.

[2] Ibid., p. 64.

[3] Irving Fisher, "A Statistical Relation between Unemployment and Price Changes," International Labour Review, Vol. XIII, No. 6, June, 1926, pp. 785-792; see also Irving Fisher, The Theory of Interest (New York: Macmillan, 1930), pp. 399-452.

[4] Von Mises, The Theory of Money and Credit, p. 165.

system," where we no longer have the proportionality concept between money and prices.[1] Mises implies that a higher quantitative variation in the supply of money will have effects "upon the subjective valuations of individuals" who attempt "to minimize their cash reserves, which are a source of continual loss."[2] He employs the hypothesis that the past behavior of prices affects the current planned cash holdings to explain why in "countries where inflation has been rapid, the decrease in the value of money has occurred faster than the increase in its quantity."[3]

Mises states that people form expectations according to the past behavior of prices and they hold money accordingly. The hypothesis that the past behavior is the basis on which people form their expectations about future price behavior has been extremely valuable in empirical research about the demand for money, especially for the countries that have a high rate of inflation.[4] Mises dealt with the complaint of "shortage of notes" while policy makers were printing money. In short, he is more radical than the traditional monetarists such as Wicksell, Fisher, and Friedman. For him, "not only

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[1]Von Mises, The Theory of Money and Credit, p. 145.

[2]Ibid., p. 227.

[3]Ibid., p. 227.

[4]Philip Cagan, "The Monetary Dynamics of Hyperinflation," in Milton Friedman (ed.), Studies in the Quantity Theory of Money (Chicago: University of Chicago Press, 1956), pp. 25-117.

does money matter, but it matters all the time!"[1]

The Cambridge Equation

The Cambridge Equation was advanced by Alfred Marshall, A. C. Pigou and other "Cambridge" economists. Marshall did not produce a full statement of his theory. However, we see the impact of Mises and Irving Fisher on Marshall and the Cambridge school in formulating the Cambridge Equation and demand for money where the individual has a choice at the margin because money is capable of yielding satisfaction in and of itself, since it satisfies his needs both for convenience and security.[2] The core of this approach is stated by Pigou as follows:

> . . . everybody is anxious to hold enough of his resources in the form of titles to legal tender (money) both to enable him to effect the ordinary transactions of life without trouble, and to secure him against unexpected demands, due to a sudden need, or to a rise in the price of something he cannot easily dispense with.[3]

Other things being equal (wealth, rate of interest, expectation), the quantity of money demanded varies proportionately with the level of money income; i.e.,

$$M_d = kOP = kY$$

where: M_d = nominal quantity of money demanded

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[1]Lawrence S. Moss, "The Monetary Economics of Ludwig Von Mises," in Lawrence S. Moss (ed.), The Economics of Ludwig Von Mises (Mission, Kansas: Sheed and Ward, Inc., 1976), p. 40.

[2]Harry G. Johnson, Marcoeconomics and Monetary Theory, pp. 58-62; also John T. Boorman and Thomas M. Havrilesky, Money Supply, Money Demand, and Macroeconomic Models, p. 168.

[3]A. C. Pigou, "The Value of Money," The Quarterly Journal of Economics, Vol. 32 (November, 1917), p. 41.

k = a functional relationship representing the ratio of money people want to hold to their money income

O = output

P = price level

Y = level of money income = (OP)

In equilibrium we have:

$$M_s = M_d$$

Which gives us:

$$M_s = kY$$

When we formulate the Fisherian Equation of exchange in terms of income we get:

$$MV = \Sigma PO = Y$$

$$MV = Y$$

and hence:

$$M_s \frac{1}{k} = M_s V = Y$$

where k is the reciprocal of Fisher's V, the income velocity of money. From the above reasoning, we are able to show the similarity of the Cambridge Equation to Fisher's Equation.

What is seen in the Cambridge version is a clear incorporation of Mises' view of individual choice-making behavior into the demand for money analysis. "The real advantage" of the Cambridge Equation over quantity theory in the formulation of demand for money, says Pigou, is that "it brings us at once into relation with volition--an ultimate cause of demand--instead of with something that seems

at first sight accidental and arbitrary."[1]

The Cambridge k is not a constant. Given the institutional framework, it would change with changes in the (1) degree of preference for present consumption over future consumption, (2) expectations concerning the streams of return from investment and (3) expectations about price movements.[2] On the last point, Pigou indicates that ". . . any expectation that general prices are going to fall increases people's desire to hold (money); and any expectation that they are going to rise has the contrary effect."[3] A point which is not far from what Mises stated earlier is that there is no proportionality between money and prices.

In short, the Cambridge version inspired the economists to consider a utility analysis of the demand for money and consider money as simply one asset in a multi-asset portfolio. The development of the concept of uncertainty and the application of the general theory of demand to money balances and asset holdings led to the development of Keynes' Liquidity Preference Theory and the reformulation of the Fisherian model by Friedman.[4]

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[1]A. C. Pigou, "The Value of Money," p. 54.

[2]John T. Boorman and Thomas M. Havrilesky, Money Supply, Money Demand, and Macroeconomic Models, p. 171.

[3]Pigou, "The Value of Money," p. 45.

[4]John T. Boorman and Thomas M. Havrilesky, op. cit., p. 172.

Keynes

For John Maynard Keynes, money is essential because the future is uncertain and unpredictable. Money provides the most important link between the present and the uncertain future since it is the most liquid and least risky of all assets available as stores of value over time. As a matter of fact, it is for this reason that people are willing to hold money for transaction purposes rather than physical goods, and to make all their contracts, debts and exchanges denominated in terms of money. As far as the demand for money is concerned, however, there is special emphasis on different variables in his analysis according to the economic situation of the time. If there is a high rate of inflation, the aim of Keynes is to formulate a theory for policy prescription, or if we have massive unemployment, then the theory is formulated to get rid of the problem of unemployment.

In Keynes' view, it is "needful to turn a penetrating gaze upon contemporary facts and glean from them, by science, by intuition, by political imagination, new types of remedies for new types of evils."[1] This kind of concern for current problems led him in formulating the demand function for money as a function of expected rate of inflation and wealth during the early 1920's. His analysis is an extension of Mises' work, The Theory of Money and Credit. He asserted

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[1]R. F. Harrod, The Life of John Maynard Keynes (New York: Harcourt, 1951), p. 336.

that the public's demand for money is a behavior choice and the elasticity of demand for money is not unity. If the elasticity was unity, he said that "there would be no limit to the sums which the Government could extract from the public by means of inflation."[1] When there is a high cost on the holders of money, people "begin to change their habits and to economize in their holding of notes." The public, in order to protect themselves from the high cost of depreciation, decides to convert their money to (a) durable goods, (b) foreign hard currency and carry as little cash as possible, "even at the cost of great personal inconvenience."[2] Moreover, he states that at the last stage of monetary mismanagement, the expected rate of inflation is greater than the rate of money supply pumped into the economy by the government which ignores the cumulative formation of expectation of the population. For Keynes, expectation formation is a slow process. Once it is formed, he states, it generates further expectations in the same direction. In Keynes' words, as a result of credit cycle, "price movements tend to be cumulative, each movement promoting, up to a certain point, a further movement in the same direction."[3]

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[1]John Maynard Keynes, Monetary Reform (New York: Harcourt, 1924), p. 53.

[2]Ibid., p. 51.

[3]John Maynard Keynes, Essays in Persuasion (New York: Harcourt, 1932), p. 215.

Eventually, this process of taxation through inflation not only "relaxes production, but leads finally to the waste and inefficiency of barter."[1] This kind of demand analysis is a short-run analysis in which other important functional variables do not change appreciably. The theoretical and empirical work developed by Cagan follows the same analysis of demand for money.[2]

Keynes later dealt with the problem of real balances in A Treatise On Money. He stated that the public's demand for money in terms of real balances is related proportionately to the volume of transactions, the rate of discount and the expected future course of prices. The demand to hold money as a proportion of the volume of transactions occurs when "the rate of discount and the deposit rate of interest are low." However, "when the interest payable and obtainable on loans is high, then there will be a powerful motive to restrict balances to as low a level as is in any way practicable, even if this involves taking some risk in the provision made against contingencies."[3] In other words, the wealth-maximizing individual makes a rational decision to hold a

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[1]John Maynard Keynes, The Economic Consequences of the Peace (New York: Harcourt, 1920), p. 240.

[2]See Philip Cagan, "The Monetary Dynamics of Hyperinflation," in Milton Friedman, ed., Studies in the Quantity Theory of Money (Chicago, Ill.: University of Chicago Press, 1956), pp. 25-117.

[3]John Maynard Keynes, A Treatise on Money, Vol. II (New York: Harcourt, 1930), p. 45.

certain amount of money in his portfolio. The sensitivity of transactions demand for money to the opportunity cost of holding money had been worked by Pigou and Keynes long before Baumol and Tobin "formulated" their theories.[1] Keynes had done brilliant work in his Treatise attempting to explain movements in the price level and its effects on the public's demand for cash balances. The modern empirical research on monetary phenomena is not something strange to Treatise, be it monetarist or Keynesian.

Keynes, however, switched from his earlier approach of Treatise to that of The General Theory which is seeking to explain the determination of employment. For that reason, the money aspect of his analysis is neglected as Harrod succinctly indicated that "The General Theory is basically an analysis of the causes of unemployment."[2]

Nevertheless, the approach to the demand for money in the General Theory dominates the economic textbooks. For that reason, it is necessary to summarize the Keynesian theory of liquidity preference.

Keynes argued that there are three motives why people demand money. These are (a) the transactions, (b) the

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[1]William J. Baumol, "The Transactions Demand for Cash: An Inventory Theoretic Approach," Quarterly Journal of Economics, Vol. 55, November, 1952, pp. 545-556; James Tobin, "The Interest-Elasticity of Transactions Demand for Cash," Review of Economics and Statistics, Vol. 38, August, 1956, pp. 241-247.

[2]Harrod, The Life of John Maynard Keynes, p. 453.

precautionary, and (c) the speculative motives. Keynes states, in developing the concepts in detail to explain the motives for liquidity preference, that "the subject is substantially the same as that which has been sometimes discussed under the heading of the demand for money."[1]

Keynes asserts that the amount of money demanded by individuals and by the sum of the individuals for transactions purposes would be in a stable relationship and proportional to the level of income. However, this proportionality is not absolute. In a later article, he states that "in a given state of expectation both the active and the passive demands depend on the rate of interest."[2] In other words, the individual makes a rational choice of how much money he could hold in his portfolio when there are alternative interest-earning assets. The individual, faced with lucrative returns from interest-earning assets, will economize the necessity of holding cash to bridge the gap between the receipts of payments and the disbursement of such proceeds.

The precautionary motive according to Keynes is related to the demand for balances in two aspects: (a) the demand for cash as a certain proportion of total resources "to provide for contingencies requiring sudden expenditure

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[1]John Maynard Keynes, The General Theory of Employment, Interest and Money (New York: Harcourt, 1936), p. 194.

[2]John Maynard Keynes, "The 'ex-ante' Theory of the Rate of Interest," The Economic Journal, Vol. 47, December, 1937, p. 668.

and for unforeseen opportunities of advantageous purchases, . . ." (b) the demand to hold an asset whose "value is fixed in terms of money to meet a subsequent liability fixed in terms of money."[1] The demand for money arising from the precautionary demand would also be dependent, to a large extent, on the level of income.

Mises, Marshall and Pigou had indicated that uncertainty about the future was one of the motives that might be expected to influence the demand for money. Keynes' analysis of the speculative motive is a successful attempt to formalize this concept and draw conclusions from it. As Keynes states, "the aggregate demand for money to satisfy the speculative motive usually shows a continuous response to gradual changes in the rate of interest, i.e., there is a continuous curve relating changes in the demand for money to satisfy the speculative motive and changes in the rate of interest as given by changes in the prices of bonds and debts of various maturities."[2] Moreover, he continues to say that it is "important to distinguish between the changes in the rate of interest which are due to changes in the supply of money available to satisfy the speculative motive, without there having been any changes in the liquidity function, and those which are primarily due to changes in expectation

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[1]Keynes, The General Theory, p. 196.

[2]Ibid., p. 197.

affecting the liquidity function itself."[1]

Consequently, the aggregate demand for money, M_d, can be found by summing the individual's demand for transactions, precautionary and speculative balances. By following Keynes, we can write:

$$M = M_1 + M_2 = L_1(Y) + L_2(r),$$

where: M_1 = the transactions and precautionary demand for money, which is treated as a function of income.

M_2 = the speculative demand for money which is a function of the interest rate.

The distinction among transactions, precautionary, and speculative balances is insignificant except as a help to clarify the individual's total demand for money. The important point is that the individual's demand for money is a function of his income (Y), his wealth (W),[2] the rate of interest (r), the expected rate of interest (r^e), the expected level of prices (P^e).[3] Restated,

$$\frac{M^d}{P} = L(Y, W, r, r^e, P^e), \text{ where P is the price level.}$$

Keynes explained that the subdivision of the total demand

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[1]Ibid., p. 197.

[2]The amount of cash people wish to hold, Keynes states as early as 1923, "depends partly on the wealth of the community. . . ." in John Maynard Keynes, Monetary Reform, p. 85.

[3]John Maynard Keynes, "Alternative Theories of the Rate of Interest," The Economic Journal, Vol. 47, June, 1937, pp. 241-252; also see "The 'ex-ante' Theory of the Rate of Interest," The Economic Journal, Vol. 47, December, 1937, pp. 663-669; and also see A Treatise on Money, Vol. II, pp. 42-47.

for money was a matter of analytical convenience,

> Money held for each of the three purposes forms, nevertheless, a single pool, which the holder is under no necessity to segregate into three water-tight compartments; for they need not be sharply divided even in his own mind, and the same sum can be held primarily for one purpose and secondarily for another . . . we can . . . consider the individual's aggregate demand for money . . . as a single decision. . . .[1]

This analytical improvement by Keynes is significant in that he places the demand for money in a behavioral framework consistent with the concept of rational choice in an uncertain world in which the individual's demand for money as a demand for a particular asset through the influence of expectations is firmly established.

The Demand for Money: The Transactions and Speculative Approach

Previously, Pigou, Keynes and Hansen emphasized the sensitivity of the transactions demand for money to the rate of interest; however, a systematic theory of this relationship was first worked out by William J. Baumol and later by James Tobin.[2] They recognized that there is an opportunity cost for holding transactions balances idle: either interest foregone by holding money instead of financial instruments that give a return in the form of interest or dividend, or

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[1] Keynes, The General Theory, p. 195.

[2] William J. Baumol, "The Transactions Demand for Cash: An Inventory Theoretic Approach," Quarterly Journal of Economics, Vol. 66, November, 1952, pp. 545-556; James Tobin, "The Interest-Elasticity of Transactions Demand for Cash," Review of Economics and Statistics, Vol. 38, August, 1956, pp. 241-247.

interest to be paid for borrowing money. In their opinion, the transactions demand for money is a problem of inventory theory. The formulation of this theory by Baumol seeks to minimize the costs of acquiring and holding cash. The problem is similar to an entrepreneur's problem of how to minimize the costs of an inventory: with a large inventory interest is foregone; with a small inventory a large number of requent orders has to be made, which by itself can be a costly process.

Baumol advances by assuming that a stock of cash is the holder's inventory of the medium of exchange, and that a rational person will try to minimize the cost of holding this inventory by holding an appropriate amount of money and financial instruments such as bonds. He supposes that transactions are perfectly foreseen and occur in a steady stream over a given time period. His real income per period is T (Tobin uses Y) dollars, and by assumption, the individual will pay out all of his T dollars at a constant rate. As a result, he will be holding an ever diminishing stock of assets. However, he considers that the individual begins holding all of his income in bonds at the start of the period. The individual is assumed to withdraw cash in lots of C dollars evenly spaced, and each time he makes a withdrawal, he has to pay a fixed "broker's fee" of b dollars. When he obtains cash, he is foregoing interest opportunity cost, r, of holding bonds. He states that T, the value of transactions,

is predetermined, and r and b are supposed to be constant.

Naturally he will make $\frac{T}{C}$ withdrawals during the period at a cost equal to $b \cdot \frac{T}{C}$ which includes not only the explicit costs (brokerage fees) of selling assets to get money but also the implicit costs (the inconvenience) of doing so. At the same time, if cash is held instead of bonds, the foregone interest, r, must be considered as a part of the total cost. He considers the withdrawal of C dollars by the individual as expended at a constant rate and withdraws out a similar amount the moment it is spent, then his average cash balance will be $\frac{C}{2}$, which is half of the amount of his transactions from the sale of bonds. The cost of holding cash per period will then be $r \frac{C}{2}$, which is "interest opportunity cost."

The total cost of holding the inventory cash, where K is the cost, therefore, can be written:

$$K = b \cdot \frac{T}{C} + r \frac{C}{2}$$

The problem then becomes that of finding the value of C that minimizes the total cost (transactions costs plus interest foregone) of holding the inventory of cash, which can be done by taking the derivative of K with respect to C, set it equal to zero:[1]

$$\frac{dK}{dC} = \frac{-bT}{C^2} + \frac{r}{2} = 0$$

and solve for C. This gives us the expression:

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[1]The second-order minimum condition is satisfied as well: $\frac{d^2K}{dC^2} = \frac{2bT}{C^3} > 0$.

$$C = \sqrt{2bT/r}$$

Since the optimal cash holdings over the period have an average value of $\frac{C}{2}$, then we have:

$$\frac{C}{2} = \frac{1}{2}\sqrt{2bT/r}$$

This expression is the same as the demand for real cash balances:

$$\frac{M^d}{P} = \frac{C}{2} = \frac{1}{2}\sqrt{2bT/r}$$

This shows that the rational individual, behaving as to minimize the cost of holding real transactions balances, will demand money in proportion to the square root of the volume of his transactions and inversely proportional to the square root of the interest rate.

The demand for nominal balances, then, becomes:[1]

$$M^d = kr^{-\frac{1}{2}}T^{\frac{1}{2}}P \text{ where } k = \frac{1}{2}\sqrt{b}$$

Thus, in a simple situation, the rational individual, given the price level, demands money in proportion to the square root of the value of his transactions. Baumol says nothing about the utility of holding cash for transactions

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[1] $\frac{M^d}{P} = \frac{1}{2}\sqrt{2bT/r} = \frac{1}{2}\sqrt{2b/r}\quad TP = \frac{1}{2}\sqrt{2b}\ T^{\frac{1}{2}}r^{-\frac{1}{2}}P$

This can be expressed as:

$$M^d = kr^{-\frac{1}{2}}T^{\frac{1}{2}}P \text{ where } k = \frac{1}{2}\sqrt{2b}$$

The inverse relationship to the rate of interest is noticed when we have a partial derivative of M^d to r such that:

$$\frac{\partial M}{\partial r} = -\frac{1}{2}kr^{-3/2}T^{1/2}P < 0$$

purposes, or the trade off between such utility and interest rates. The strong point of his approach is that one does not need to find notions about the utility of demand for money necessary. All one needs to know is that we need cash as the means of exchange for transactions and there are costs involved in transforming bonds into cash, and the existence of a brokerage fee.

Moreover, the concept of the square root formula indicates that demand for cash rises less than in proportion with the volume of expenditures, so there should be economics of scale in management of money holdings which implies the importance of the monetary policy. In other words, with constant prices, an increase or decrease in the supply of money will have a greater effect on employment than it would if the demand for money were proportional to income.[1] The non-proportionality can be shown below:[2]

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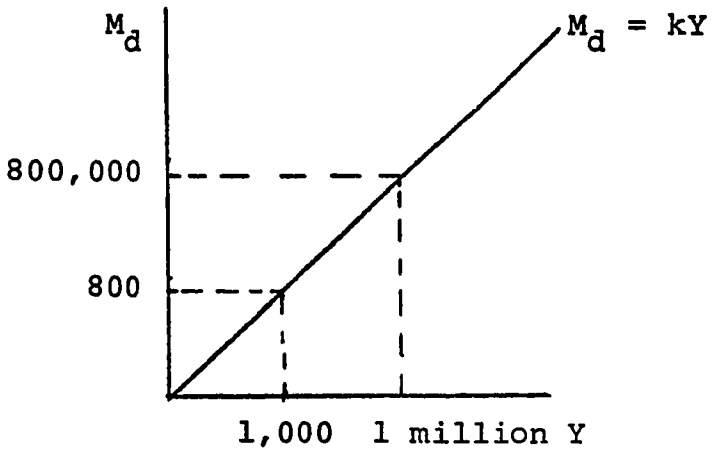
[1] Baumol, "The Transactions Demand for Cash: An Inventory Theoretic Approach," p. 551; also see Laidler, Demand for Money, p. 66.

[2] From $M^d = kr^{-\frac{1}{2}}T^{\frac{1}{2}}P$ it can be observed that:

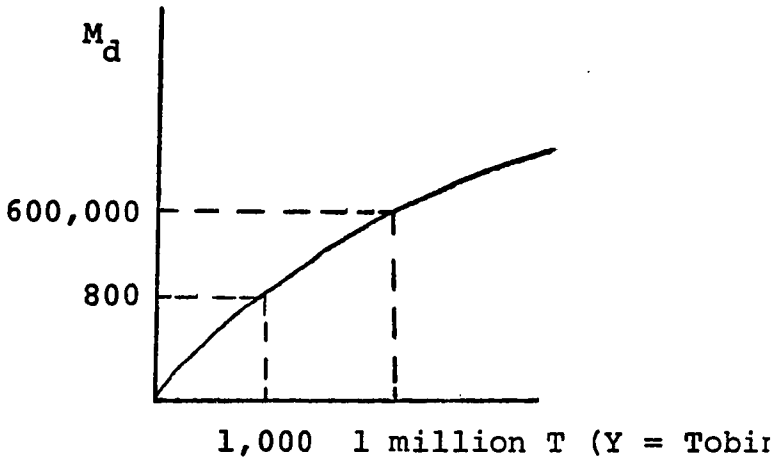
$$\frac{\partial M^d}{\partial T} = \frac{1}{2} kr^{-\frac{1}{2}}T^{-\frac{1}{2}}P \neq k \text{ and:}$$

$$\frac{\partial^2 M^d}{\partial T^2} = -\frac{1}{4} kr^{-\frac{1}{2}}T^{-3/2}P < 0$$

This shows that when T increases, the demand for money does not increase by k.



Classical demand for money is proportional to income.



The demand for money is not proportional to income.

The concept of non-proportionality implies that the income elasticity of demand for money is less than unity, a point which has been stated by Keynes to indicate the importance of the individual's rational choice by deciding how much balances he should carry.[1]

Tobin's approach emphasizes the maximization of the return from wealth portfolio. His expression can be shown as:

$M^d = kr^{-\frac{1}{2}}y^{\frac{1}{2}}P$ where y is income.

Teigen's formulation of the demand for money is not different from the above development. We can write it as below:[2]

$M^d = kr^a y^b P$ where $a < 0$, $b > 0$.

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[1]John Maynard Keynes, Monetary Reform, p. 53.

[2]Ronald L. Teigen, "Demand and Supply Functions for Money in the United States: Some Structural Estimates," Econometrica, Vol. 32, October, 1964, pp. 476-509.

The inventory approach, however, seems not to be supported by empirical evidence because it refers to average cash holdings where in fact data ascribed to cash held at a point of time is an accounting measure.[1]

The transactions demand for money is just a part of Keynesian demand for money. Moreover, we have speculative demand for money. In order to get a downward sloping demand curve for money for the economy, Keynes assumed that individuals would hold bonds or money, but not both at the same time. Furthermore, he assumed inelastic interest rate expectations for different individuals. With these critical assumptions, he thought he got the "smooth" liquidity preference curve for the economy as a whole.[2] However, if we look at individual behavior, we cannot get a smooth sloping demand curve for money as proved by Tobin.[3] The contribution of Tobin to monetary economics is that the theory of risk avoiding behavior has been presented to provide a case for liquidity preference and for an inverse relationship between the demand for cash balances and the rate of interest. Moreover, his model is not based on the inelasticity of expectations of future interest rates, but based on the assumption that the expected value of capital gain or

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[1]Harry p. Johnson, Macroeconomics and Monetary Theory, p. 80.

[2]Keynes, General Theory, pp. 71, 202.

[3]James Tobin, "The Liquidity Preference Behavior Towards Risk," The Review of Economics Studies, Vol. 25, February 1958, pp. 65-86.

loss of holding consols is always zero. In this respect, Tobin's theory is an obvious improvement over the early Keynesian theory by providing a logically more satisfactory foundation for liquidity preference.

Furthermore, he introduces risk into the problem and explains the holding of a diversified portfolio by the individual. Nevertheless, his analysis is based on the previous theory by assuming the same two-asset world, and on the assumption that money is not dominated by other assets as a means of holding assets.

The Demand for Money: A Neo-Classical Approach

The important role of monetary policy from 1936 to the early 1960's was de-emphasized. There was a widespread feeling that monetary control was rather unimportant. In other words, it was argued that changes in the supply of money are absorbed by corresponding changes in the velocity of circulation. Moreover, the rate of increase of the money supply would be closely connected with a decrease in velocity and prices, and outputs would not be changed. The effect of increasing the money supply, if any, was thought to generate lower interest rates and lower interest rates would induce additional investment. Thus, additional investment through the investment multiplier would increase income and employment. Keynes did not see a key in traditional quantity theory to solve the unemployment problem and he objected to it:

> Thus, if it is practicable to measure the quantity, O, and the price, P, of current output, we have Y = OP,

> and, therefore, MV = OP. . . . For the purposes of the real world it is a great fault in the Quantity Theory that it does not distinguish between changes in prices which are a function of changes in output, and those which are a function of changes in the wage-unit. The explanation of this omission is, perhaps, to be found in the assumptions that there is no propensity to hoard and that there is always full employment. For in this case, O being constant and M_2 being zero, it follows, if we can take V also as constant, that both the wage-unit and the price-level will be directly proportional to the quantity of money.[1]

Thus, that was the end of the role of money in policy analysis, and the end of quantity theory. The income-expenditure approach gave more hope and responsibilities to the authorities to cure unemployment with autonomous expenditures. The recollections of the deflation of the 1930's reinforced the emphasis on government expenditure to increase the aggregate demand.

However, the high rate of inflation after World War II, and during the Korean and Vietnam wars, gave an opportunity to economists to analyze and challenge the shortcomings of income-expenditure models in dealing with the problem of creeping inflation and monetary mismanagement. This led the profession to reexamine and study the impact of money on the economy. The neo-classical approach to the analysis of money was stated by Friedman in "an elegant exposition of the modern portfolio approach to the demand for money which . . . can only be seen as a continuation of

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[1]Keynes, General Theory, p. 204.

the Keynesian theory of liquidity preference."[1] Thus, that is the "restatement" of the theory of money, the main aspect of which is a demand function for money, where the demand function is featured "as part of capital or wealth theory, concerned with the composition of the balance sheet or portfolio of assets."[2]

In plain language, the new quantity theory of money is nothing but the integration of Mises, Fisher, Pigou and Keynes' theories expressed in a more sophisticated fashion. For this very reason we do not have one "quantity theory of money." Rather, as Friedman states it, "The quantity theory of money is a term evocative of a general approach rather than a label for a well-defined theory."[3] Moreover, "the analytical framework" of this new approach is nothing but "Keynesian."[4] The basic features of the new approach in Friedman's words are:

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[1]Don Patinkin, "The Chicago Tradition, The Quantity Theory, and Friedman," Journal of Money, Credit and Banking, Vol. 1, February, 1969, p. 47.

[2]Milton Friedman, "A Theoretical Framework for Monetary Analysis," in Robert J. Gordon (ed.), Milton Friedman's Monetary Framework (Chicago: The University of Chicago Press, 1974), p. 11; Friedman first formulated his theory in "The Quantity Theory of Money--A Restatement," in Studies in the Quantity Theory of Money in 1956.

[3]Milton Friedman, "The Quantity Theory of Money--A Restatement," in Studies in the Quantity Theory of Money, p. 3.

[4]Don Patinkin, "Friedman on the Quantity Theory and Keynesian Economics," in Robert J. Gordon (ed.), Milton Friedman's Monetary Framework, p. 114.

1. The quantity theory is in the first instance a theory of the demand for money. It is not a theory of output, or of money income, or of the price level. Any statement about these variables requires combining the quantity theory with some specifications about the conditions of supply of money and perhaps about other variables as well.

2. To the ultimate wealth-owning units in the economy, money is one kind of asset, one way of holding wealth . . . the theory of the demand for money is a special topic in the theory of capital. . . .

3. The analysis of the demand for money on the part of the ultimate wealth-owning units in the society can be made formally identical with that of the demand for a consumption service. As in the usual theory of consumer choice, the demand for money (or any other particular asset) depends on three major sets of factors: (a) the total wealth to be held in various forms--the analogue of the budget restraint; (b) the price of and return on this form of wealth and alternative forms; and (c) the tastes and preferences of the wealth-owning units.[1]

In his restatement of the Quantity Theory, the demand for money in its most simplified form becomes:

$$M = f(P, r_b, r_e, \frac{1}{P}\frac{dP}{dt}, W; \frac{Y}{r}; u) \qquad (2.1)$$

Where: M = the nominal quantity of money

P = price level

r_b = the rate of return on bonds

r_e = the rate of return on equities

$\frac{1}{P}\frac{dP}{dt}$ = the rate of change of the price level

W = the ratio of non-human to human wealth

$\frac{Y}{r}$ = wealth or permanent income

u = tastes and preferences

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[1]Milton Friedman, "The Quantity Theory of Money--A Restatement," in Milton Friedman (ed.), Studies in the Quantity Theory of Money, p. 4.

Then equation (1) is taken to be homogeneous in degree in both P and Y. With some simplification, it is written as follows:

$$\lambda M = f(\lambda P,\ r_b,\ r_e,\ \frac{1}{P}\frac{dP}{dt};\ W;\ \lambda Y,\ u)$$

$$= \lambda f(P,\ r_b,\ \frac{1}{P}\frac{dP}{dt};\ W;\ Y;\ u) \qquad (2.2)$$

where λ is some constant multiplier.

The demand for real balances can be inferred by letting $\lambda = \frac{1}{P}$, that is,

$$\frac{M}{P} = f(r_b,\ r_e,\ \frac{1}{P}\frac{dP}{dt};\ w;\ \frac{Y}{P};\ u) \qquad (2.3)$$

where $\frac{M}{P}$ is the real quantity of money demanded "as a function of 'real' variables independent of nominal monetary values."[1] Alternatively, when he lets $\lambda = \frac{1}{Y}$, equation (2.2) becomes:

$$\frac{M}{Y} = f(r_b,\ r_e,\ \frac{1}{P}\frac{dP}{dt},\ w,\ \frac{P}{Y},\ u)$$

$$= \frac{1}{v(r_b,\ r_e,\ \frac{1}{P}\frac{dP}{dt},\ w,\ \frac{Y}{P},\ u)} \qquad (2.4)$$

which can be written as:

$$Y = v(r_b,\ r_e,\ \frac{1}{P}\frac{dP}{dt},\ W,\ \frac{Y}{P},\ u).M$$

"In this form the equation is in the usual quantity theory form, where v is income velocity."[2]

Lord Keynes attacked the quantity theory on the grounds that it neglected the impact of the rate of interest on velocity. In Keynesian theory,

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[1] Ibid., p. 11.

[2] Ibid., p. 11.

$$M = [k(r)]Y = \frac{Y}{v(r)}$$

which is similar to Friedman's version, that is,

$$Y = [v(\ )]M.$$

"In a sense, Friedman is solidly in the Keynesian camp--or, more accurately, his theory is more a variation on a Keynesian rather than a neoclassical theme."[1]

In later years, because of his critics, Friedman had to acknowledge the fact that his reformulation of the quantity theory had "been strongly affected by the Keynesian analysis of liquidity preference."[2] From the above analysis, as Friedman indicates, the fact that "almost every economist will accept the general lines of the preceding analysis on a purely formal and abstract level, although each would doubtless choose to express it differently in detail."[3] However, he goes on to distinguish three main features of the quantity theorist as follows:

> (i) The quantity theorist accepts the empirical hypothesis that the demand for money is highly stable--more stable than functions such as the consumption function that are offered as alternative relations. . . . The quantity theorist need not, and generally does not, mean that the . . . velocity of circulation of money is to be regarded as numerically constant over time. . . . For the stability he expects is the functional relation

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[1]Stephen Rousseas, Monetary Theory (New York: Alfred Knopf, Inc., 1972), p. 183.

[2]Milton Friedman, "The Quantity Theory of Money," in A. A. Walters (ed.), Money and Banking, p. 51.

[3]Milton Friedman, "The Quantity Theory of Money--A Restatement," in Milton Friedman (ed.), Studies in the Quantity Theory of Money, p. 15.

> between the quantity of money demanded and the variables that determine it. . . The quantity theorist not only regards the demand for money function as stable; he also regards it as playing a vital role in determining variables that he regards as of great importance for the analysis of the economy as a whole, such as the level of money income or of prices. . . .
>
> (ii) The quantity theorist also holds that there are important factors affecting the supply of money that do not affect the demand for money. . . .
>
> (iii) The demand for money is not infinitely elastic (viz., absence of a "liquidity trap").[1]

The Stable Demand Function for Money

The new approach gives great emphasis to the stability of the demand for money function. A function is called stable if the variables of the function explain the unknown variable completely or predicts its direction with some certainty and if the function, at the most, changes slowly over time. A function could be stable in a great number of variables, however, when the economists use the term "a stable money demand function" they mean a function which is stable in a small number of variables. When the demand function for money is stable, money can have a systematic influence on the economy. For this very reason, the policy makers could predict the consequences of monetary measures.[2] For that matter, "a stable demand function is useful precisely in order to trace out the effects of changes in supply, which means that it is useful only if supply is affected by at

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[1] Ibid., pp. 15-16.

[2] H. Visser, The Quantity of Money, p. 112.

least some factors other than those regarded as affecting demand."[1]

When the authorities print more money--nominal money balances increase; however, what matters to individuals are the real money balances. If the nominal money balances people hold in a particular moment of time is greater than what they wish to hold, they will try to dispose of their excess money balances by paying out "a larger sum for the purchase of securities, goods and services, for the repayment of debts, and as gifts than they are receiving from the corresponding sources."[2] Hence, the desire by the public to maintain a certain amount of real money balances would render "either a reduction in the real quantity available to hold through price rises or an increase in the real quantity desired through output increases."[3] Thus, the "new approach" has postulated a direction and a certain link between changes in the money supply and changes in prices and output, which has far-reaching implications as far as the role of money for stabilization policies are concerned. The "new approach" believes the money supply will affect only the level of prices in the long run. The change in

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[1]Friedman, "The Quantity Theory of Money--A Restatement," in Studies in the Quantity Theory of Money, pp. 16-17.

[2]Friedman, "A Theoretical Framework for Monetary Analysis," in Milton Friedman's Monetary Framework, pp. 2-3.

[3]Ibid., p. 3.

output in the short run is a transitory phenomenon.[1]

Empirical studies have been undertaken to test the hypothesis of whether we have a stable demand function or not. The result of these findings indicate the existence of a stable demand for money even in countries which had suffered from hyperinflations.[2] Moreover, the concept of linear homogeneity of the demand for money was tested by Meltzer and he concluded that "A doubling of prices and the value of financial assets doubles the demand for nominal balances but leaves the demand for real balances unaffected."[3] In other words, this implies that the demand for real balances is entirely dependent upon the real explanatory variables.

Friedman

Friedman treats the demand for money like his treatment of any other asset. For him, in formulating the demand for money, ". . . the most fruitful approach is to regard money as one of a sequence of assets, on a par with bonds, equities, houses, consumer durable goods, and the like."[4]

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[1]Milton Friedman, "The Role of Monetary Policy," The American Economic Review, Vol. 58, No. 1, March 1968.

[2]Philip Cagan, "The Monetary Dynamics of Hyperinflation," in Milton Friedman (ed.), Studies in the Quantity Theory of Money, pp. 25-117.

[3]Allan H. Meltzer, "The Demand for Money: The Evidence from the Time Series," The Journal of Political Economy, Vol. 71, June 1963, p. 227.

[4]Milton Friedman, "The Demand for Money: Some Theoretical and Empirical Results," The Journal of Political Economy, Vol. 67, August 1959, p. 349.

However, his ultimate aim is to test the prediction of the hypothesis against empirical evidence by stating that the demand for money is, like consumption, a function not of current measured income but of permanent income, an exponentially weighted average of current and past incomes. He was moved to suggest this by the cyclical behavior of velocity. Velocity rose during booms and fell in depressions, yielding a positive relationship between income and velocity and velocity exhibited a long-run secular fall for the U.S. data from 1870 to 1951.[1] He tries to reconcile these facts by utilizing the concept of permanent income, Y_p.

Velocity, he states, is determined by the demand for money because the demand for money is in real terms and the stock of real balances is something which the public controls. His assertion that velocity is a demand for money phenomenon is more elaborate:

> The nominal stock of money is determined in the first instance by the monetary authorities or institutions. . . . Holders of money cannot alter this amount directly. But they can make the real amount of money anything that in the aggregate they want to. . . . The real stock of money is determined in the first instance by the holders of money. . . . Given the level of real income . . . income velocity is uniquely determined by the real stock of money. Consequently . . . it too is determined by the holders of money.[2]

Friedman's empirical analysis to explain money demand behavior leads him to test the following equation

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[1]Velocity has been rising in the U.S. since 1951.

[2]Ibid., pp. 330-331.

to aggregate data:

$$\frac{M}{NP} = \gamma\left(\frac{Y_p}{NP_p}\right)^{\delta}$$

or, in logarithmic form, $\ell n\ (M/NP) = \ell n\gamma + \delta \ell n\left(\frac{Y_p}{NP_p}\right)$

where M = the nominal quantity of money

P = measured price level

N = population

Y_p = permanent nominal income

P_p = permanent price level

γ and δ = behavioral parameters.

This equation expresses the fact that real per capita money balances demanded are a function of real per capita permanent income.[1] Hence, the rate of interest and the rate of price changes have been left out from the empirical function as explanatory variables. As Friedman states:

> In our experiments, the rate of interest had an effect in the direction to be expected from theoretical considerations but too small to be statistically significant. We have not as yet been able to isolate by correlation techniques any effect of the rate of change of prices, though a historical analysis persuades us that such an effect is present.[2]

The result of his empirical studies for the period 1869-1957 shows the permanent income elasticity of demand for money, δ to be 1.8, which is substantially greater than unity--an indication that money balances are considered to

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[1] Ibid., pp. 335-336.

[2] Ibid., p. 329.

be a "luxury" by consumers.[1] Hence the demand for real balances will rise faster than Y_p and "real" velocity falls as Y_p rises, which is the secular pattern he observes.

The high income elasticity of demand for money in Friedman's empirical work has been under attack from all sides. As Laidler indicates, "the rate of interest, whatever the actual series that might be used to measure it, has a statistically significant negative effect on the demand for money, however defined. . . . Friedman's inability to find a close relationship between the demand for money and the rate of interest is a result of the test procedure he followed. . . . As to the permanent income elasticity of demand for money of 1.8, this would appear from subsequent evidence to be partly the result of omitting the rate of interest from the function fitted. . . ."[2]

Meltzer, using the rate of interest on 20-year bonds for r, found a meaningful negative relationship between the demand for money and the rate of interest.[3] Moreover, Brunner and Meltzer have found that the rate of interest plays a significant role in demand for money, however defined. They state this relationship very clearly:

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[1]Ibid., pp. 328-329.

[2]David Laidler, "The Definition of Money: Theoretic and Empirical Problems," Journal of Money, Credit and Banking, Vol. 1, No. 3, August 1969, p. 517.

[3]Allan H. Meltzer, "The Demand for Money: The Evidence from the Time Series," Journal of Political Economy, Vol. 71, June 1963, pp. 219-246.

> . . . the data suggest that interest rates enter significantly in the velocity equations and in the demand for money equations from which the velocity equations are derived. Including interest rates as an additional variable in Friedman's permanent income model improves the prediction of measured velocity from the model.[1]

Furthermore, the results of empirical work undertaken by Chow, Teigen, Laidler and Heller lend further support to the existence of a significant negative relationship between the demand for money and the rate of interest.[2]

Harry Johnson stated that the reason why Friedman omitted the rate of interest in his formulation was ideological because "to admit interest rates into the demand function for money is to accept the Keynesian Revolution and Keynes' attack on the quantity theory."[3] However, Friedman categorically rejected his critics by stating "I know no empirical student of the demand for money who denies that interest rates affect the real quantity of money demanded, though

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[1]Karl Brunner and Allan Meltzer, "Predicting Velocity: Implications for Theory and Policy," Journal of Finance, Vol. 18, May, 1963, p. 350.

[2]Gregory Chow, "On the Short-Run and Long-Run Demand for Money," Journal of Political Economy, Vol. 74, April 1966, pp. 111-131; Ronald Teigen, "Demand and Supply Functions for Money in the United States," Econometrica, Vol. 32, October 1964, pp. 477-509; David Laidler, "The Rate of Interest and the Demand for Money--Some Empirical Evidence," Journal of Political Economy, Vol. 74, December 1966, pp. 545-555; H. R. Heller, "The Demand for Money--The Evidence from the Short-Run Data," Quarterly Journal of Economics, Vol. 79, May 1965, pp. 291-303.

[3]Harry G. Johnson, "A Quantity Theorist's Monetary History of the United States," Economic Journal, Vol. 75, June 1965, pp. 338-396.

others have misinterpreted me as so asserting."[1] All he meant was that interest rates "appear to be less important as a determinant of quantity demanded than real per capita income. . .; and that the interest elasticity is not very high." In other words, "the basic differences among economists are empirical, not theoretical," as Friedman mildly indicated.[2] When this is the case, from the Keynesian point of view, Teigen, rightly so, stated that "there is very little if anything in monetarist theory which is new and different. Rather the two approaches diverge in ways which basically are methodological and operational."[3]

Despite Friedman's affirmation of the effect of the rate of interest on the demand for money, his operational money demand function in empirical studies for the United States is only related to the permanent income, Y_p. Thus, his contribution to the field lies in his attempt to define relevant variables to be included "in analyzing the demand

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[1]Milton Friedman, "Interest Rates and the Demand for Money," Journal of Law and Economics, October 1966, p. 72; reprinted as Chapter 7 in The Optimum Quantity of Money: And Other Essays (Chicago: Aldine, 1969), pp. 142-155.

[2]Milton Friedman, "A Theoretical Framework for Monetary Analysis," in Robert J. Gordon (ed.), Milton Friedman's Monetary Framework, p. 61.

[3]Ronald L. Teigen, "A Critical Look at Monetarist Economics," Federal Reserve Bank of St. Louis Review, January 1972, pp. 10-25; reprinted in Readings in Money, National Income, and Stabilization Policy (Homewood, Ill.: Richard D. Irwin, third edition, 1974), pp. 123-147. The quotation is taken from the reprinted version, p. 137.

for money on an empirical level,"[1] and shake Keynesians into reformulating their own paradigms.[2]

The Demand for Money in a Fragmented Economy

The economies of most of the third world countries are "fragmented" in the manner that entrepreneurship and people are so much "isolated that they face different effective prices for land, labor, capital, and produced commodities and do not have access to the same technologies."[3] Moreover, financing from outside the individual enterprise is either unknown or extremely limited in the fragmented economy. Firms are unable to issue primary securities and individuals cannot buy them.[4] The banking system does not play an important role in intermediation between savers and firms. For these very reasons, we encounter poorly developed markets for investment and for consumer durables, which limit the ability of people to hold their money in alternative forms since they face few "organized" markets for such primary securities as bonds, mortgages, or common stock. In this kind of economy, such as Chile, the measured income would

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[1]David E. W. Laidler, The Demand for Money: Theories and Evidence, p. 57.

[2]Stephen W. Rousseas, Monetary Theory, p. 221.

[3]Ronald I. McKinnon, Money and Capital in Economic Development (Washington, D.C.: The Brookings Institution, 1973), p. 5.

[4]Raymond W. Goldsmith, Financial Structure and Development (Yale University Press, 1969), p. 374.

have as great an effect on the demand for money as upon the permanent components. Deaver indicates:

> with choices so limited, the additional savings accumulated from transitory income may be kept in the form of cash, assuming no change in the cost of holding money due to changes in the rate of inflation. Short-run rigidity in the investment and consumer durables markets could also lead to a somewhat higher proportion of the transitory component of income being consumed rather than saved.[1]

Deaver wanted to test the demand for money hypothesis in Chile where ". . . money holders may respond and to large changes in the cost of holding money and to substantial changes in expected income as well."[2] For this very reason, he formulated an equation of the following form:

$$\log M/P^1 = b_o + b_1C^* + b_2 \log y^1 + v$$

where: M/P^1 = real stock of money per capita

C^* = expected rate of change in the cost of living index

y^1 = real per capita national income

b_1C^* = the elasticity of demand for money in terms of the expected rate of change in prices

b_2 = income elasticity of demand for money.

His empirical work supports the money-demand hypothesis for Chile.[3]

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[1] John V. Deaver, "The Chilean Inflation and the Demand for Money," in David Meiselman (ed.), Varieties of Monetary Experience, p. 32.

[2] Ibid., p. 10.

[3] Ibid., p. 34.

Following Deaver's work on Chile, Diz's study confirms the hypothesis that the demand for per capita money balances in Argentina, during 1935-1962, is "a stable function of the cost of holding money and real per capita income, and that these two variables alone explain a high fraction of the observed variability of those balances."[1] Cassuto's study on Brazil gives the same conclusion. Cassuto, however, concludes that demand for money in Brazil is explained better when independent variables are the actual rate of inflation, and per capita permanent income.[2]

Most of the studies on the demand for money of fragmented economies do not include the rate of interest as one of the explanatory variables, for the simple reason that a legal ceiling is imposed on them.[3] One study on Nigeria includes the rate of interest as one of the independent variables with no success. Not only the explanatory power of interest rate is nill, furthermore, it has opposite signs.[4] The writer comes to the conclusion that "large changes in the interest rates are needed to induce asset holders to change

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[1]Adolfo Cesar Diz, "Money and Prices in Argentina, 1935-1962," in David Meiselman (ed.), Varieties of Monetary Experience, p. 971.

[2]Alexander E. Cassuto, "Monetary Stability and Inflation in Brazil," Economia Internazionale, Vol. 29, No. 1-2, Feb./March 1976, pp. 161-175.

[3]Maxwell J. Fry, "Manipulating Demand for Money," in Michael Parkin and A. R. Nobay (eds.), Essays in Modern Economics (New York: Harper & Row Publishers, Inc., 1973), pp. 371-385.

[4]Simeon Ibi Ajayi, "Some Empirical Evidence on the Demand for Money in Nigeria," The American Economist, Vol. 21, Spring 1977, No. 1, pp. 51-54.

the composition of their portfolios."[1] Since the interest rates are "perverted" and controlled, the rate of inflation could have been a better explanatory variable for the study on Nigeria because "the cost of holding money is the rate at which the value of money is expected to decline due to rising prices."[2]

This undertaking will follow the hypothesis that demand for money is a function of income and the expected rate of inflation based on the methodology of this section.

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[1]Ibid., p. 54.

[2]Deaver, p. 25.

CHAPTER III

THE DEMAND FOR MONEY: THE CASE OF TURKEY

The study of the demand for money for Chile by Deaver and the Brazilian Economy by Silveira and Cassuto[1] are called "intermediate," because they fall somewhere between the experiences of hyperinflation and relative price stability as well as the rate of growth of the economy over time. In other words, the important variables to test the demand for money hypothesis for these economies were real income and the rate of inflation. Silveira estimates the demand for money for the period 1948-1967. During this period, the Brazilian economy had undergone substantial changes: (a) money income rose at an average yearly rate of 38 percent; (b) the average rise in real income was 5.4 percent; (c) the money supply increased at an average yearly rate of 36 percent; (d) the wholesale prices increased 31 percent per year on the average. He found the demand for money was explained by both income and expected rates of increase in prices. The same result for Chile was obtained by Deaver.

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[1]Antonio M. Silveira, "The Demand for Money: The Evidence from the Brazilian Economy," The Journal of Money, Credit and Banking, February 1976, pp. 162-175.

Like Brazil, the Chilean economy had experienced a secular increase in real income and an almost yearly 8 percent rate of inflation for a long span of time.

Just as Turkey stands geographically between the meeting place of Europe and Asia, with some of the attributes of each and belonging fully to neither, so she also fits into the intermediate category with a history of steady increase in real income, and a continuous and substantial increase in prices.

Since 1950, the country has had an economic growth rate of about 6.6 percent per year in real terms, while witnessing an inflation rate of 10.2 percent on average over the same period. However, as Table 3-1 clearly indicates, the country has experienced more than a 20 percent annual average rate of inflation since 1973. Furthermore, consumer prices have increased 14 percent since 1969. Nevertheless, the rate of inflation in Turkey is greater than the industrial countries and less than that for most of the less industrialized countries. This point is seen clearly in Table 3-2.

Since 1950, after the population growth rate of about 2.6 percent per year was taken into account, the average annual increase in per capita income has been around 3.9 percent. In other words, average per capita incomes have increased almost 2.5 times in 27 to 28 years. Table 3-3 shows this point very clearly. In plain language, since both the price and per capita income changes have been

Table 3-1

Increases in Gross National Product at 1968 Market Prices and Implicit Price Deflator in Turkey, 1948-1976

Year	Real GNP (millions of Turkish Liras at 1968 Market Prices)	Percentage Change over Previous Year	Implicit Price Deflator of GNP	Percentage Change in Implicit Price Deflator	Consumer Price Index for Istanbul 1968=100	Percentage Change in CPI
1949	35,212.8	-4.9	25.7	.4		
1950	38,505.9	9.4	25.2	-1.9		
1951	43,446.4	12.8	26.8	6.3		
1952	48,621.1	11.9	27.5	2.6		
1953	54,090.5	11.2	28.0	5.1		
1954	52,480.3	-3.0	30.3	4.8		
1955	56,641.6	7.9	33.8	11.5		
1956	58,428.0	3.1	37.7	11.5		
1957	62,994.9	7.8	46.5	23.3		
1958	68,844.3	4.5	53.2	14.4		
1959	68,521.2	4.1	63.7	19.7		
1960	70,868.6	3.4	65.8	3.4		
1961	72,285.6	2.0	68.5	4.1		
1962	76,754.3	6.2	75.0	9.5		
1963	84,188.2	9.7	79.3	5.7		
1964	87.619.4	4.1	81.4	2.6		
1965	90,367.9	3.1	84.9	4.3		
1966	101,204.3	12.0	90.3	6.4		
1967	105,460.5	4.2	96.3	6.6		
1968	112,493.4	6.6	100.0	3.8	100	--
1969	118,594.1	5.4	105.4	5.3	108.1	8.1
1970	126,170.0	6.4	117.3	11.2	115.3	6.7
1971	138,990.	10.2	138.6	18.3	133.4	15.7

Table 3-1 (continued)

1972	149,350.	7.5	161.2	16.4	149.1	11.8
1973	157,380.	5.4	196.9	22.1	172.1	15.4
1974	169,000.*	7.4	252.	28.4	199.4	15.9
1975	182,440.*	8.0	293.6	16.2	237.7	19.2
1976	197,150.*	8.1	337.0	14.8	279.0	17.4
Annual Percent Increase		6.2		9.9		13.8
Average Percent Increase Since 1950		6.6		10.2		--
Average Percent Increase Between 1969-1976		7.3		16.6		13.8
Average Percent Increase Between 1971-1976		7.8		19.4		15.9

*Provisional

Sources: Constant GNP from National Income and Expenditure of Turkey, 1948-1972; National Income and Expenditure of Turkey, 1962-1973, State Institute of Statistics (Ankara), 1973, 1974; Annual Report, 1976, Central Bank (Ankara), 1977; International Monetary Fund, International Financial Statistics, various issues. Implicit Price Deflator calculated from Nominal GNP and constant GNP from the same sources. Consumer Price Index for Istanbul from State Institute of Statistics reported in International Financial Statistics.

Table 3-2

Rate of Change in Consumer Prices Per Year for Different Countries Since 1969

	1969	1970	1971	1972	1973	1974	1975	1976	1969-76 Average	1973-76 Average
Industrial Countries	4.8	5.6	5.1	4.5	7.5	12.6	10.7	7.7	7.3	9.6
United States	5.4	5.9	4.3	3.3	6.2	11.0	9.2	5.7	6.3	8.0
Germany	1.9	3.4	5.2	5.5	7.0	7.0	5.9	4.6	5.1	6.1
Sweden	2.8	6.9	7.4	6.0	6.8	9.8	9.9	10.4	7.5	9.2
Spain	2.2	5.8	8.2	8.3	11.4	15.6	17.0	17.6	10.8	15.4
Turkey	7.9	6.9	15.7	11.8	15.4	15.8	19.3	17.4	13.8	17.0
Indonesia	16.5	12.4	4.4	6.5	31.2	41.1	19.1	20.0	18.9	27.9
Columbia	10.1	7	9.1	14.3	22.8	24.5	26.1	17.4	16.4	22.7
Less Industrialized Countries	7.1	9.3	10.1	13.5	21.7	31.4	29.9	34.2	19.7	29.3

Source: International Monetary Fund, International Financial Statistics, Supplement 1952-76, May 1977 (Washington), 1977.

Table 3-3

Increases in Population and
Real-Capita Income in Turkey, 1948-76

Year	Population (thousands) Mid-Year	Percentage Increase Over Previous Year	Real Per Capita GNP at 1968 market Prices (in Turkish Liras)	Percentage Increase Over Previous Year
1949	20,360	2.2	1729.5	-7.0
1950	20,809	2.2	1850.4	7.0
1951	21.352	2.6	2034.8	10.0
1952	21,953	2.8	2214.8	8.8
1953	22,571	2.8	2396.5	8.2
1954	23,206	2.8	2261.5	-5.6
1955	23,859	2.8	2374.0	5.0
1956	24,442	2.4	2390.5	0.7
1957	25,252	3.3	2494.6	4.4
1958	25,983	2.9	2534.1	1.6
1959	26,735	2.9	2563.0	1.1
1960	27,509	2.9	2576.2	.5
1961	28,233	2.6	2560.3	-.6
1962	28,933	2.5	2652.8	3.6
1963	29,655	2.5	2838.9	7.0
1964	30,394	2.5	2882.8	1.5
1965	31,151	2.5	2901.0	.6
1966	31,934	2.5	3169.2	9.2
1967	32,750	2.6	3220.2	1.6
1968	33,585	2.5	3349.5	4.0
1969	34,442	2.6	3443.3	2.8
1970	35,321	2.6	3572.1	3.7
1971	36,221	2.5	3837.3	7.4
1972	37,146	2.6	4020.6	4.8
1973	38,094	2.6	4131.4	2.8
1974	39,066	2.6	4326.0	4.7
1975	40,063	2.6	4553.8	5.3
1976	41,085	2.6	4798.6	5.4
Average Percentage Increase Per Year		2.6		3.5
Average Percentage Increase Since 1950		2.6		3.9

Sources: Population from the State Institute of Statistics, Statistical Yearbook of Turkey, 1973, (Ankara, State Institute of Statistics, Printing Division, 1974), p. 29, and the International Financial Statistics, 1977 (various issues). Per Capita real GNP calculated from Table 3-1.

significant, it is more likely and reasonable to assume that the demand for money in Turkey would be related to changes in both income and cost of holding money, rate of inflation. Before explaining the development in the principal variables in the estimating equations of the demand for money, it will be a proper point to explain the changes in the economy since 1950.

Economic Trends Since 1950

The Turkish economy has grown at a rapid pace and has undergone substantial transformations. In 1950 the per capita Gross National Product (GNP) stood at $165 in current dollars. The United States' per capita GNP was $1,887 in current dollars. The ratio was 11.4. However, Turkey's per capita Gross Domestic Product in 1976 was $946. The United States' per capita Gross Domestic Product stood at $7,850 in current dollars. The ratio of the United States per capita Gross Domestic Product to that of Turkey was 8.3. Again, the relative economic development of the country can be seen from Table 3-4. The rate of growth in per capita Gross Domestic Product on an annual average base between 1969 and 1976 was 4.5 percent for Turkey, 2.8 percent for the European Economic Community, 1.4 percent for the United States and 6 percent for Greece. Turkey embarked upon its Five-Year Development Plans in 1963. It is beneficial to show the trend of development in the per capita domestic product in Turkey and other countries in order to understand

Table 3-4

Per Capita Gross Domestic Product
at 1970 Prices and 1970 Exchange Rates ($)

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1969-76 Average Annual Rate of Growth
United States	4823.0	4895.3	4789.2	4875.9	5111.9	5349.3	5228.0	5104.8	5384.0	
% in Per Capita GDP		1.5	-2.2	1.8	4.8	4.6	-2.3	-2.4	5.5	1.4
Greece	925.5	1052.1	1132.7	1208.2	1307.2	1396.6	1341.2	1410.6	1467.7	
% in Per Capita GDP		13.7	7.7	8.2	8.2	6.7	-4.0	5.2	4.0	6.
EEC	2264.6	2385.9	2472.5	2535.2	2616.7	2746.2	2781.5	2714.9	2823.3	
% in Per Capita GDP		5.4	3.6	2.5	3.2	4.9	1.3	-2.4	4.0	2.8
Turkey	343	348	363.8	388.7	404.6	412.4	436.2	463.5	486.9	
% in Per Capita GDP		1.5	4.5	6.8	4.1	1.9	5,8	6.3	5.0	4.5
*Less Industrialized Countries			210	230						
% in Per Capita GDP				9.5						

*In current dollars.

Sources: Organization for Economic Co-operation and Development, Main Economic Indicators, July 1977 and other issues; United Nations, Statistical Yearbook, 1974,

the relative performance of the economy compared to other economies. This is provided in Table 3.5. Turkey's overall rate of growth of per capita Gross Domestic Product has averaged over 4 percent during the period, 1962 to 1976. Compared to some other countries' economic performances, it seems satisfactory. However, facing rising problems of unemployment, inflation and chronic balance of payments deficits, a country like Turkey had to do better to keep its relative position. Comparing the performance of the economy of South Korea, which had experienced the annual average rate of growth of 9.6 percent in GNP between 1963 and 1972, Turkey had about a 6.8 percent rate of growth in its GNP during the same period.[1] The economic growth of Turkey would be a satisfactory achievement except that it provided no basis for self-sustained, long-term development with a large competitive industrial and agricultural base. Moreover, the distribution of the benefits of growth has been unequal not only between the people, but between the regions. Turkish monetary policy gave greater preferences in its credit distribution to the more advanced regions.

In spite of the agriculturally oriented development of an industry, a strong bias toward capital-using industries has generally focused on import-substitution. Because of

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[1]Charles R. Frank, Jr., Kwang Suk Kim, Larry E. Westphal, Foreign Trade Regimes and Economic Development: South Korea (New York: National Bureau of Economic Research, 1975), p. 11.

Table 3-5

Average Percent Changes at Annual Rates in Per Capita Gross Domestic Product for Different Countries

	1962-1973	1963-1972	1963-1973	1963-1967	1968-1972	1973-1976
Turkey	3.7	3.6	3.4	3.1	4.0	4.8
Greece	7.5	7.6	7.5	6.9	8.3	3
Japan	8.9	8.9	8.9	9.1	7.8	3
United States	2.9(1)	2.8(1)	3.0(1)	3.4(1)	2.1(1)	1.4
Spain	5.7	5.5	5.5	5.4	5.8	
EEC	3.9	3.8	3.9	3.4	3.0	2.0

(1) Based on GNP

Sources: Organization for Economic Cooperation and Development, National Accounts of OECD Countries (1962-1973), Main Economic Indicators of OECD countries, July, 1977 and other issues; For the United States till 1973 from United States Department of Commerce/Bureau of Economic Analysis, Survey of Current Business, July 1976/Volume 56, No. 7.

insignificant industrial exports, the burden of financing the imports of capital goods and raw materials needed by the industrial sector has fallen heavily on traditional agricultural exports and the remittances of workers abroad. Even though, after 1967 the remittances of workers abroad has increased and agriculture has grown nearly 4.3 percent since 1950, agricultural exports and remittances of workers have been unable to earn sufficient foreign exchange to finance the growing import bill.

Industry

One of the aims of the policy makers was to industrialize the country. For this matter, rapid industrialization led to substantial structural changes in the economy and population: the share of industry in Gross Domestic Product (at 1968 factor price) increased from 11.9 percent in 1950 to 22.9 percent in 1976; the share of agriculture, however, in Gross Domestic Product, declined from about 44.9 percent in 1950 to about 23.8 percent in 1976, and that of services and others increased from 43.2 percent to 53.2 percent. Moreover, the public sector increased its share of production in industry and construction. The public investment in industry increased the share of value added by public industry to total industry from about 37 percent in 1950 to 46 percent in 1963 and showed no noticeable gain thereafter.

Growth in industry since 1950 has increased 9.1 percent annually. Turkey's industrial rate of growth was about 8.7 percent annually during 1950-1960. However, growth in industry during the period of planned economy has been about 9.3 percent per year between 1962 and 1976. The public sector has held an important position throughout the industrialized process. During the 1950's, new State Economic Enterprises were created in order to accelerate the pace of economic development. This trend of public investment and finance of State Economic Enterprises has been one of the culprits of inflation and mismanagement. State Economic Enterprises (SEEs) had been unable to raise the prices of their products due to Government controls. The new government, however, subsequently agreed to let the market determine the prices of products produced by State Economic Enterprises.[1] This would force the SEEs to follow a flexible management and pricing policy which would reduce the "pressure on the Central Bank resources" to a minimum.[2]

The development of the Turkish industry is dependent on agriculture and foreign exchange. The slow-down in the rate of industrial growth in 1974-1975 was due to the slow-down of agricultural output due primarily to drought. For this very reason there is a close relationship between the

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[1]"The Turk in the Middle," Euromoney, September 1977, p. 19.

[2]Ibid., p. 19.

annual variations of agriculture production and the food industry. The foreign exchange constraint was one of the crucial factors which slowed down the industrial growth in the 1950's. The industrial sector is facing the same problem in the middle of 1977.

Industrialization has been the principal aim of all levels of government in the country since the introduction of formal economic planning in 1963. Planning is aimed at obtaining higher rates of growth and in turn providing employment opportunities to the rising population. Nevertheless, only 16.8 percent of the civilian employment was in the industry and construction sector, 59.9 percent in agriculture, and 23.3 percent in services in 1976.[1] However, 8.6 percent of the civilian employment was in the industry and construction sector, 80.8 percent was in the agricultural sector, and 10.6 percent were employed in services in 1955. Table 3.7 shows this trend clearly.

When Turkey's situation is compared to that of industrialized countries such as the United States and the European Economic Community in terms of employment, the position of Turkey becomes much clearer (see Table 3-8). In 1975, in the United States, only 4.2 percent of the civilian labor force was employed in agriculture; in Turkey it was 62.8 percent; in European Economic Community countries, 8.7 percent; in Greece, 35.4 percent, respectively. The

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[1]Central Bank of Turkey, Annual Report, 1976.

Table 3-7

Population and Employment, 1950, 1955,
1960, 1965, 1970, 1975, 1976, (Thousand and Percent)

	1950		1955		1960		1965	
	'000	%	'000	%	'000	%	'000	%
Total Population---	20947	100	24065	100	27755	100	31391	100
of Which: Rural	17075	82.	18710	78	20447	74	21868	70
Urban (1)	3872	18	5355	22	7308	26	9523	30
Total Labor Force			12205	51	12993	47	14135	44
Total Civilian Employment			11695	100	12534	100	13053	100
of Which: Agriculture			9446	80.8	9737	77.7	9750	74.7
Industry			1005	8.6	1267	10.1	1425	10.9
Services			1244	10.6	1530	12.2	1878	14.4

Table 3-7 (continued)

	1970		1975		1970	
	'000	%	'000	%	'000	%
Total Population---	35605	100	40197	100	41202	100
of Which: Rural	23065	66.0				
Urban (1)	12000	34.0				
Total Labor Force	14534	41.1	16975	42		
Total Civilian Employment	13919	100	15064	100	14486(2)	100
of Which: Agriculture	9730	69.9	9455	62.8	8680	59.9
Industry	1742	12.5	2309	15.3	2435	16.8
Services	2447	17.6	3300	21.9	3371	23.3

(1) Settlements of 10,000 and more

(2) Five-Year Plan estimate reported in Annual Report of Central Bank, 1976.

Sources: State Institute of Statistics, Statistical Yearbook of Turkey, 1971, 1973; Annual Report of Central Bank, 1976; Organization for Economic Co-operation and Development, Labour Force Statistics 1956-1967, 1964-1975

Table 3-8

Civilian Employment, By Sector (Thousand and Percent)

	1955		1960		1965		1970		1975	
			'000	%	'000	%	'000	%	'000	%
Turkey: Total Employment of	11695	100.0	12534	100.0	13053	100.00	13919	100.00	15064	100.0
Which: Agriculture	9446	80.8	9737	77.7	9750	74.7	9730	69.9	9455	62.8
Industry	1005	8.6	1267	10.1	1425	10.9	1742	12.5	2309	15.3
Others	1244	10.6	1530	12.2	1878	14.4	2447	17.6	3300	21.9
United States: Total Employment of Which:	63802(*)	100.0	65778	100.00	71088	100.00	78627	100.00	84783	100.00
Agriculture	6283	9.8	5458	9.3	4361	6.1	4066	4.7	3937	4.2
Industry	22835	35.8	22526	35.2	23287	32.8	25433	32.3	24565	29.0
Others	34684	54.4	35598	55.6	43440	61.1	49732	63.3	56837	67.0
Greece: Total Employment of			3639(1)	100.0	3309	100.00	3171	100.00	3190	100.0
Which: Agriculture			1960	53.9	1606	48.5	1279	40.3	1130	35.4
Industry			698	19.2	692	20.9	802	25.3	900	28.2
Others			981	27.0	1011	30.6	1080	34.4	1160	36.4
EEC: Total Employment of					100845	100.00	101195	100.00	100837	100.0
Which: Agriculture					13530	13.4	10630	10.5	8728	8.7
Industry					44380	44.0	44381	43.9	42001	41.7
Others					42936	42.6	46183	45.6	50109	49.7

(*) The estimation is for 1956

(1) The estimation is for 1961

Sources: Organization for Economic Cooperation and Development, Labour Force Statistics (1956-1967), (Paris, 1969); Labour Force Statistics (1964-1975), (Paris, 1977).

Turkish economy had employed not more than 15.3 percent of its working civilians in industry. Moreover, more than 2 million unemployed people were looking for opportunities to be employed. No field other than industry and industry-related sectors can provide needed opportunities.

Agriculture

The contribution of the agricultural sector to Gross Domestic Product (at constant factor cost) declined from about 45 percent in 1950 to about 23.8 percent in 1976. A country like Turkey, which depends so much on agriculture, is, therefore, still in the early phases of industrial development. The relative importance of agriculture remains large since almost 60 percent of employment is directly related to agricultural production and a large portion of industrial process is dependent on this sector. After this clarification, Table 3-9 which presents the percentage distribution of the Gross Domestic Product industrial origin at constant factor cost and Appendix 3-1 give a relative outlook about the composition of output by different sectors for the whole economy. Table 3-10 shows the relative economic structure of Turkey with respect to the economies of some other countries. In 1975, as it is seen in Table 3-10, agriculture constituted 23.4 percent of the Gross Domestic Product of Turkey at market value at 1970 prices, for the United States, the contribution of agriculture was 2.7 percent; for Germany, 3.3 percent; for Greece, 14.7 percent;

Table 3-9

Percentage Distribution of Gross Domestic Product
by Industrial Origin, at Factor Cost, at 1968 Prices

	Agriculture	Industry	Construction	Wholesale and Retail Trade	Transport and Communication
1948	48.0	11.5	4.6	7.1	5.1
1949	44.2	11.9	5.8	7.8	5.3
1950	44.9	11.9	6.1	8.0	5.3
1951	47.7	10.9	5.9	7.8	5.3
1952	47.3	11.0	6.3	8.4	5.5
1953	46.0	11.7	6.9	8.4	5.7
1954	40.8	13.1	7.7	8.8	6.4
1955	41.2	13.4	7.6	8.8	6.4
1956	41.5	14.2	6.8	8.5	6.6
1957	40.5	14.9	7.7	8.5	6.8
1958	42.3	14.6	6.7	8.3	6.3
1959	41.1	14.5	6.6	9.2	6.8
1960	40.7	14.3	6.6	9.0	6.8
1961	38.2	15.9	6.4	9.4	6.9
1962	38.1	15.5	6.5	9.6	7.2
1963	38.1	15.6	6.5	9.9	7.2
1964	36.4	16.6	6.9	10.2	7.4
1965	34.1	17.8	7.0	10.6	7.7
1966	33.8	18.3	7.0	10.9	8.0
1967	32.5	19.0	7.0	11.1	7.9
1968	30.7	20.1	7.2	11.3	8.4
1969	29.3	21.0	7.1	11.5	8.7
1970	29.1	20.6	7.3	11.4	8.8
1971	30.0	20.7	6.4	11.7	8.7
1972	27.8	20.9	6.4	13.1	9.6
1973	24.0	22.4	6.6	14.0	10.3
* 1974	24.3	22.3	6.5	14.3	10.3
* 1975	24.8	22.3	6.4	14.4	10.2
(1)1976	23.8	22.9	6.5	14.5	10.6

* Provisional
(1)Estimation
Source: Appendix Table 3-1

Table 3-9 (continued)

Banking, Insurance, and Other Financial Institutions	Ownership of Dwellings	Business and Personal Services	Government Services	Gross Domestic Product at Factor Cost
1.0	8.2	5.1	9.4	100.0
1.2	8.8	5.1	9.9	100.0
1.1	8.2	5.1	9.4	100.0
1.1	7.2	5.1	9.0	100.0
1.2	6.7	5.0	8.6	100.0
1.3	6.3	5.1	8.6	100.0
1.5	6.9	5.1	9.7	100.0
1.6	6.6	5.1	9.3	100.0
1.6	6.5	5.1	9.2	100.0
1.6	6.2	5.1	8.7	100.0
1.8	6.1	5.1	8.8	100.0
1.8	5.8	5.1	9.1	100.0
1.8	6.0	5.1	9.7	100.0
1.9	6.0	5.1	10.2	100.0
1.8	5.9	5.1	10.3	100.0
1.9	5.5	5.1	10.2	100.0
1.9	5.6	5.1	9.9	100.0
1.9	5.5	5.1	10.3	100.0
1.9	5.2	5.1	9.7	100.0
2.0	5.2	5.2	10.1	100.0
2.1	5.1	5.1	10.0	100.0
2.3	5.0	5.1	10.0	100.0
2.3	5.1	5.1	10.3	100.0
2.3	5.0	5.2	10.0	100.0
2.3	4.8	5.2	9.9	100.0
2.5	4.9	5.2	10.2	100.0
2.5	4.8	5.2	10.0	100.0
2.4	4.7	5.2	9.7	100.0
2.4	4.6	5.2	9.6	100.0

Table 3-10

Percentage Distribution of GDP in Purchaser's Value
by Kind of Economic Activity for Some Countries at 1970 Prices

Country	Year	GDP Product	Agriculture	Industry	Construction	Others
Korea *	1965	100.0	39.0	21.	3	37
	1970	100	28	25	6	41
	1972	100	28	26	5	41
Turkey	1965	100.0	31.8	18.9	6.3	43.0
	1970	100.0	27.1	21.6	6.6	44.7
	1975	100.0	23.4	23.8	5.9	46.9
United	1965	100.0	3.1	30.8	5.7	60.4
States	1970	100.0	2.8	29.8	4.9	62.5
	1975	100.0	2.7	27.9	3.8	65.6
Greece	1965	100.0	20.6	15.7	8.5	55.2
	1970	100.0	15.7	19.4	7.7	57.2
	1975	100.0	14.7	22.0	6	57.3
Germany	1965	100.0	3.4	44.8	8.6	43.2
	1970	100.0	3.1	46.5	8.1	42.3
	1975	100.	3.3	48.2	7.	41.5
Japan **	1965	100.	9.5	35.0	6.4	49.1
	1970	100.0	6.4	38.6	7.3	47.7
	1974	100.	5.3	36.5	6.9	51.3
Italy	1970	100.0	8.8	33.7	8.5	49.0
	1975	100.0	8.3	33.4	7	51.3

* Based on Gross Domestic Product at factor cost at current prices.
** Based on current prices.
Sources: OCED, National Accounts of OCED Countries, 1975, Vol. II; For Korea, percentages taken from United Nations' Yearbook of National Accounts Statistics, 1973, Vol. III. International tables, (New York), 1975.

for Italy, 8.3 percent, respectively.

With the advent of free elections and a new government in power in 1950, farmers for the first time in the history of the republic were able to get government support and subsidies and marketing opportunities for their products.

The Menderes government gave priority to road-building and investment in infra-structure in the rural sector with generous agricultural price supports and other pricing incentives[1] to the peasantry whose political support kept the Menderes government in power until a military coup in 1960. From 1950 until 1960 agriculture grew 6.2 percent annually. However, during the planned economy period, 1963-1976, this growth rate fell to 3.5 percent. Nevertheless, agricultural policy of the country, with some modification, has followed the same path of comprehensive price support for agricultural products, which arrests the forces of supply and demand to play their role in determining market prices.

There are many state Economic Enterprises in the field of agriculture to regulate, subsidize and buy the products above the market price. The Soils Product Office (TMO) is in charge of price support and price control of important agricultural products such as wheat and cereals. This government enterprise is in continuous deficit. However, its operating losses are financed by the government. The Sugar

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[1]Anne O. Krueger, Foreign Trade Regimes and Economic Development: Turkey (New York: National Bureau of Economic Research, 1974), p. 8.

Factories Corporations' losses are financed with generous loans from the Central Bank.[1] Turkish State Monopolies, Meat and Fish Corporation and other government corporations are in loss and these losses, in return, are financed from the Treasury or the Central Bank, which is one of the causes of increase in the money supply. Moreover, the Central Bank and the Agricultural Bank provide credit to the public and private sectors in agriculture, and this one, too, is another channel to increase the money supply.

The agricultural product support and purchase scheme in Turkey not only prevents more efficient resource allocations to alter production patterns, but also hampers the producers' incentives to export these commodities. Since the producers get a higher price for low quality products from the government, they have less incentives to export their products. The result is the accumulation of costly surplus products at the hand of government, which otherwise could have been exported. For instance, in the middle of 1977, the exportable stocks of agricultural products amounted approximately to $1 billion, the main items of which were: wheat (1976 crop), $334 million; olive oil (1976 produce), $136 million; cotton (yards) $99 million; sugar (1976 produce), $25 million.[2]

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[1]Edmond Asfour, Turkey: Prospects and Problems of an Expanding Economy (Washington, D.C.: World Bank, 1975), pp. 181-215.

[2]"The Turk in the Middle," Euromoney, September 1977, p. 19.

For a viable economy, the change in this pattern would reduce the increase in the rate of money supply and provide more incentives for exports.

Consumption, Investment and Saving

Since the inception of Five-Year Plans in 1962, the policy makers' principal concern under successive development plans have been to accelerate investment and thus set going a process of self-sustaining economic growth by increasing the investment of the public sector. However, the implementation and realization of investment plans proved to be difficult for a variety of reasons, one of which was the inability of the country to resist the substantial increases in real incomes of consumers following successive wage and salary increases and rising agricultural prices. Furthermore, workers' remittances from abroad went into direct consumption. The impact of successive wage and salary increases on consumption and investment can be seen by glancing at the percentages of some variables in Table 3-11.

The rate of wage increase in manufacturing between 1967-1975 was 16.7 percent per annum. The same thing was valid for the wages in the coal and oil industry. As a rule, when the regular revenues of the public budget is not enough to finance the larger volume of current expenditures on wages, salaries and income transfers that becomes inevitable as a result of rising cost of living and aggressive unionism, the government has to resort to borrowing funds from the

Table 3-11

Percentages Increases in Wages,
Consumption and Gross Fixed Capital Formation

	1967	1968	1969	1970	1971	1972	1973	1974	1975	1968-1972	1973-1975	1967-1975
Percentage Annual Increase in Wages of Manufacturing	9.2	9.3	17.5	12.3	14.1	11.0	26.7	23.8	26.6	12.8	25.7	16.7
% Annual Increase in Wages of Oil And Coal Workers	22.1	5.1	.2	-3.8	24.7	13.0	25.8	-1.0	58.7	7.8	27.8	16.0
Percentage Annual Increase in Private Consumption	3.1	7.3	5.3	2.0	14.2	6.7	1.2	12.4	9.4	7.0	7.7	6.8
Percentage Annual Increase in Government Consumption	8.7	6.8	6.5	3.6	6.1	7.3	8.8	5.2	13.1	6.0	9.0	7.3
Percentage Annual Increase in Gross Fixed Capital Formation	6.5	13.4	6.4	13.5	-5.0	14.8	14.1	15.6	17.4	8.4	15.7	10.7

Sources: The percentages for wages is calculated from Section 19, reported in International Labour Office, Year Book of Labour Statistics, 1976 (Geneva,) 1976; the rest is taken from OECD, National Accounts of OECD Countries (1975), Vol. I.

Treasury to undertake some of the planned investment projects, and finance current expenditures which causes further rises in the cost of living. This case is very clear in 1971 when military personnel and civilian workers demanded higher wages and salaries, the Gross Fixed Capital formation declined 5 percent in that very year. Private consumption increased 14.2 percent and government consumption increased by 6.1 percent in real terms. Moreover, total consumption was 82.9 percent of the Gross Domestic Product in 1970, because of the increase in wages and salaries, total consumption increased to 85.4 percent of the Gross Domestic Product in 1971 and 86.8 percent of the Gross Domestic Product in 1975. In plain language, private and government consumption as a percentage of the Gross Domestic Product has increased from 73.1 and 11.8 percent in 1950 to 73.6 percent, 13.2 percent in 1975, respectively. In other words, total consumption increased from 84.9 percent of the Gross Domestic Product in 1950 to 86.8 percent of the Gross Domestic Product in 1975. However, from 1950 until 1966 total consumption did not show a considerable decline as a ratio of Gross Domestic Product. From 1966 until 1970, policy makers were able to reduce the ratio of total consumption to that of the Gross Domestic Product in order to accelerate the rate of fixed capital formation. That process stopped with military intervention in 1971, which resulted in higher wages and salaries and, as a consequence, less saving by the state for investment ventures (see Table 3-12).

Table 3-12

Expenditure on Gross Domestic Product
in Purchaser's Values at 1970 Prices

	GDP (billions of Turkish Liras)	Percentage Distribution					
		Total Consumption	Private Consumption	Public Consumption	Gross Fixed Capital Formation	Increase In Stocks	Net Exports
1950	45.1	84.9	73.1	11.8	16.1		-.9
1951	50.9	87.00	76.2	10.8	15.2		-2.2
1952	57.0	86.8	76.8	10.0	17.3		-4.2
1953	63.4	85.6	74.8	10.8	17.7		-3.4
1954	61.5	86.3	74.0	12.3	17.5		-3.8
1955	66.5	86.9	73.7	13.2	16.7		-3.6
1956	68.7	87.0	75.3	11.7	14.9		-1.8
1957	74.1	86.4	75.6	10.8	14.6		-.8
1958	77.5	87.1	75.9	11.2	13.9		-.8
1959	81.1	88.6	77.1	11.5	13.8		-2.3
1960	83.4	87.3	75.3	11.9	14.9		-2.1
1961	84.8	87.4	74.8	12.6	15.2		-2.4
1962	90.0	88.4	76.0	12.4	15.3		-3.6
1963	98.5	88.6	76.4	12.2	14.6	.9(1)	-4.1
1964	102.6	86.8	74.2	12.6	14.4	.8	-1.7
1965	105.3	87.0	74.1	12.9	14.3	.4	-1.5
1966	117.6	84.8	72.4	12.4	15.7	2.0	-2.3
1967	122.9	84.3	71.4	12.9	16.0	1.1	-1.2
1968	131.1	84.7	71.8	12.9	17.0	.7	-2.3
1969	138.1	84.8	71.8	13.0	17.2	.1	-1.9
1970	144.6	82.9	70.0	12.9	18.6	1.3	-2.7
1971	158.4	85.4	72.8	12.5	16.2	.9	-2.4
1972	169.1	85.3	72.7	12.6	17.4	.1	-2.9
1973	176.8	83.7	70.7	13.0	18.6	.4	-2.8

Table 3-12 (continued)

1974*	191.8	85.9	73.2	12.7	19.8	.5	-6.3
1975*	209.0	86.8	73.6	13.2	21.8	.4	-8.9

(1) From 1950 to 1962 private final consumption expenditure includes increase in stocks.
(*) Provisional estimates.
Source: OECD, National Accounts of OECD Countries, 1975, Vol. I, II (Paris), 1975.

In 1973 an elected civilian government gave more emphasis on investment and less on consumption which resulted in an increase in fixed capital formation by 14.1 percent and an increase in private consumption by 1.2 percent. The percentage of Fixed Capital Formation to that of Gross Domestic Product reached 21.8 percent in 1975. However, the rise in agricultural support prices, wages and salaries, in 1974 and 1975 increased total consumption and reduced public and domestic savings (see Table 3-13), which forced the government to finance investment projects by borrowing from abroad and paying Turkish Liras to workers' remittances from foreign lands, which caused further inflation. But this policy provided a short run benefit of increasing the ratio of Gross Fixed Capital Formation to the Gross Domestic Product from 18.6 percent in 1973 to 21.8 percent in 1975. However, the problems came too soon in the middle of 1977, that is, apparent international pressures on the government to make a trade-off between consumption and investment and reduce international borrowings. The policy makers started to reduce private consumption by allowing the rise in the prices of commodities produced by State Economic Enterprises. The success of this policy will depend on labor unions, the military, and a sound monetary and fiscal policy.

The conscious effort by the policy makers to get involved in investment projects increased the share of public investments from 38.1 percent in 1951 to about 51 percent

Table 3-13

Total Saving, and its
Distribution in Current Prices for Selected Years

	1950 (*)	1955 (*)	1960 (*)	1965 (*)	1970 (*)	1972(1)		1973(1)	
	%	%	%	%	%	B. of T.L.	%	B. of T.L.	%
Total Saving						43.8	100	55.2	100
Domestic						43.4	99.1	56.2	101.8
Public						19.8	45.2	28.2	51.1
Private						23.6	53.9	28	50.7
External						.4	.9	-1.0	1.8
Total Saving as % of GDP	9.2	13.6	12.4	16.2	20		19.1		18.8
Domestic Saving as % of GDP	9.2	13.8	13	15.9	19.1		19.1		19.2

(1) The Realization estimates
(2) The desired target
(*) National Saving as Percentage of GNP at current market prices

Sources: The data for saving between 1972-1976 from State Planning Organization reported in Annual Report of Central Bank, different issues; The data for GDP from National Accounts of OECD Countries, 1975; The data for 1950-1970 from Turkey: Prospects and Problems of An Expanding Economy (Washington, D.C., World Bank), p. 8.

Table 3-13 (continued)

1974(1)		1975(1)		1976(2)	
B. of T.L.	% of Total	B. of T.L.	%	B. of T.L.	%
82.2	100	116.4	100	135.0	100
79.8	97.1	92.8	79.7	114.3	84.7
31.5	38.3	45.4	39.0	62.7	46.4
48.3	58.8	47.4	40.7	51.6	38.2
1.4	1.7	23.6	20.3	20.7	15.3
	20.4		22.7		
	19.8		18.1		

in 1975. Moreover, there is a clear trend in investment in favor of machinery and equipment. In 1960, almost more than 65 percent of investment was in construction, dwellings and related areas. However, the share of construction in Gross Fixed Capital Formation declined to 53 percent of the total in 1973. The share of machinery and equipment was 47 percent in the same year (see Table 3-14).

The stated objectives of the government are to decrease consumption, increase domestic saving, taxation and investment to that of the level of industrial countries.

As far as the ability of the country to tax, Turkey is in a relatively good position. In 1950, the percentage share of tax revenues in GNP and Gross Domestic Product was 11.0 percent. The same share was 16.8 percent of GNP and 19.7 percent of Gross Domestic Product in 1973, respectively (see Appendix 3-2). Including social security, total tax revenues as a percentage of GNP increased from 16.5 percent in 1965 to 20.4 percent in 1972. The United States' tax burden, including social security, increased from 24.9 percent in 1965 to about 28 percent in 1972. Japan's taxation ratio to GNP stood at 20.2 percent in 1972. Table 3-15 gives a good idea where Turkey stands as far as taxation is concerned.

While Japan's tax ratio to GNP was about 20.2 percent in 1972 compared to that of Turkey which was 20.4 percent, Japan and other industrial countries not only have been able

Table 3-14

The Percentage Composition of Gross Fixed Capital Formation, in Purchaser's Values, at Current Prices

	1951	1955	1960	1962	1965	1967	1968	1970	1971
	%	%	%	%	%	%	%	%	%
GFKF	100	100.0	100.0	100.0	100.0	100	100	100	100.0
1) Dwellings	24.0	30.6	20.9	19.7	21.1	18.9	17.6	19.9	19.5
2) Other buildings	19.5	19.9	17.9	19.1	20.2	19.7	20.0	21.1	17.2
3) Other construction	20.2	22.8	25.4	22.1	29.1	29.2	29.3	25.0	23.0
4) Machinery and equipment	36.2	26.7	35.9	39.1	29.6	32.2	33.0	34.0	40.3
A) PUBLIC SECTOR	38.1	42.4	50.0	45.3	56.3	55.0	57.8	51.4	50.5
1) Dwellings	1.2	.5	.3	.8	1.0	.8	1.0	.5	.6
2) Other buildings	10.4	10.7	11.4	11.9	13.5	12.9	13.3	13.8	12.9
3) Other construction	19.1	22.1	24.8	21.0	28.3	28.9	28.8	24.6	22.6
4) Machinery and equipment	7.3	9.1	13.6	11.7	13.6	12.6	14.7	12.6	14.3
B) PRIVATE SECTOR	61.9	57.6	50	52.6	43.7	45.0	42.2	48.6	49.5
1) Dwellings	22.8	30.1	20.6	18.9	20.1	18.1	16.7	19.4	18.9
2) Other buildings	9.1	9.2	6.5	7.3	6.7	6.8	6.8	7.3	4.3
3) Other construction	1.1	.7	.6	1.1	.9	.5	.5	.4	.4
4) Machinery and equipment	28.9	17.6	22.3	25.3	16.0	19.6	18.2	21.4	25.9

(1) Realization estimates for 1973, 1974 and 1975; 1976 is the desired target. All are estimated by the State Planning Office (SPO), reported in Annual Report of Central Bank in 1974, 1975 and 1976 issues.

* Public saving was estimated to be 46.4 of total saving for the same year. The government had to borrow from Central Bank to finance the investment project in the plan.

Sources: Percentages for 1951, 1955 and 1960 from Anne O. Krueger, Foreign Trade Regimes and Economic Development: Turkey (New York: National Bureau of Economic Research, 1974), p. 13; The data for 1962-1973 from National Accounts of OECD Countries, 1975; The data about the percentage share of public and private investment for 1973 and on from Annual Report of Central Bank of Turkey, 1974, 1975 and 1976 issues.

Table 3-14 (continued)

1972		1973(1)	1974(1)	1975(1)	1976(1)
%		%	%	%	%
100.0		100	100.0	100	100
18.8		18.6			
16.8		11.4			
23.7		22.9			
40.7		47.0			
53.5		49.5	47.5	50.9	52.*
.7					
12.1					
23.3					
17.4					
46.5		50.5	52.5	49.1	47.9
18.1					
4.7					
.4					
23.3					

Table 3-15

Total Tax Revenues as
Percentage of GNP for Some Countries

	Excluding Social Security			Including Social Security			
	1965-1971	1971	1972	1965	1965-1971	1971	1972
Turkey	16.19	17.4	16.84	16.49	18.63	20.30	20.39
Sweden	32.47	34.28	34.97	35.64	39.61	41.80	43.58
United States	22.33	22.03	22.31	24.88	27.43	27.37	28.03
Greece	17.20	18.17	17.80	19.57	23.19	23.46	24.14
Germany	23.11	22.80	23.84	32.65	33.72	34.31	35.76
Japan	15.62	16.04	16.99	18.19	19.38	20.06	20.19
Spain	11.82	12.01	12.35	16.01	18.59	17.54	18.50

Sources: OECD, Revenue Statistics of OECD Member Countries (1965) 1974), (1965-71), (1965-72).

to reduce the ratio of total consumption to that of the Gross Domestic Product, but also have been able to successfully reduce the rate of total consumption to a minimum with a successful monetization process in their economies. By doing that, they were able to increase the ratio of Gross Fixed Capital Formation to Gross Domestic Product. In 1960, Gross Fixed Capital Formation constituted about 15 percent of the Gross Domestic Product in Turkey, about 25 percent in Germany, 24 percent in Japan, and 20 percent in Greece; in 1970 Turkey's share was about 19 percent, Greece's share was about 24 percent, Germany's was 26.4 percent, and Japan's was 35 percent, respectively (see Table 3-16). In 1975, the relative position of Turkey improved as far as investment decisions were concerned, however, the country suffered in not reducing private and public consumption which has to be done if the country aims to undertake planned investment projects in industry and to be able to meet the interest payment of foreign creditors who are demanding over-due payments. The rate of growth of real consumption as a percentage of GNP in Turkey is higher than for most industrial countries. One of the major reasons for the failure of the government to reduce private consumption in order to increase investment is the lack of development in financial and capital markets. The individual makes decisions between buying goods or keeping money without a capital market. When the rate of inflation is high, as is usually the case, the individual rushes to

Table 3-16

Percentages of Expenditure on Gross Domestic Product at Constant Prices for Different Countries

	Turkey				Greece				Germany	
	1950	1960	1970	1975	1950	1960	1970	1975	1951	1960
GDP	100.0	100.0	100.0	100	100	100	100	100	100	100
Total Consumption	84.9	87.2	82.2	86.4	103.5	86.0	80.2	84.3	73.3	69.4
Private	73.1	75.3	69.8	73.2	87.9	71.7	67.6	69.6	52.5	52.8
Government	11.8	11.9	12.9	13.2	15.6	14.3	12.6	14.7	20.8	16.6
Gross Fixed Capital Formation	16.1	14.9	18.7	21.8	20.5	20.3	23.6	19.5	20	24.8

Source: From the data on Gross Domestic Product of OECD countries reported in National Accounts of OECD Countries, 1975, Vol. I.

Table 3-16 (continued)

(Germany)		Japan				Spain			
1970	1975	1952	1960	1970	1975	1954	1960	1970	1975
100	100.	100	100	100	100	100	100	100	100
69.4	75.6	80.3	72.9	59.4	62.6	86.2	82.8	75.9	76.6
53.5	57.2	60.2	60.1	51.2	53.8	72.9	69.9	67.2	67.9
15.9	18.4	20.1	12.8	8.2	8.8	13.3	12.9	8.7	8.7
26.4	23.0	15.7	24.1	35.0	32.1	15.6	16.7	23.3	23.2

buy goods and services, which pushes the rate of inflation and the rate of consumption, in real terms, still higher. That was the reason why individuals formed their expectations of inflation as a result of monetary-demand management by the government. By 1971, not only did they demand higher wages and salaries, but they also increased the rate of private consumption, thus giving more fuel to the inflationary environment. Since 1970, annually the country experienced an 8.7 percent rate of increase in private consumption in real terms, which may be excessive for a country in Turkey's circumstances. Average annual private consumption between 1964 and 1975 was 6.6 percent for Turkey and 3.9 percent for the European Economic Community countries. Government consumption of Turkey increased 7.1 percent annually, compared to the European Economic Community countries' 3.5 percent during the same span of time (see Table 3-17).

Unlike the permanent income hypothesis of Friedman, the consumption behavior of the economy was influenced by money expansion and inflation. This pattern of consumption has been against the policies of the Five-Year Planners and policy makers who aimed not only to decrease the share of consumption but to slow down the rate of expansion of consumption in favor of investments. What is seen is a trend between the rate of increase in the money supply and a rate of increase in consumption. The slower the rate of expansion of money supply, the lower the rate of expansion of private

Table 3-17

Average Percent Changes in
GDP, Consumption and GFK Formation at Annual Rates

	Gross Domestic Product				Private Final Consumption Expenditure			
	1962-1967	1968-1972	1964-1975	1973-1975	1962-1967	1968-1972	1964-1975	1973-1975
Turkey	6.4	6.6	6.7	8.7	5.1	7.0	6.6	7.6
Greece	7.7	8.5	6.4	1.1	7.5	6.8	6.5	3.8
Spain	6.9	6.8	6.1	2.9	6.7	6.0	5.8	3.9
Portugal	6.3	6.1	5.6	-.7	3.6	5.8	7.5	4.7
Japan	10.3	9.4	8.1	.6	9.1	8.5	7.6	3.8
Germany	3.7	5.1	3.4	-1.3	4.0	6.1	4.1	1.4
Italy	4.9	3.8	4.0	-0.2	5.7	4.9	4.3	.1
United States	5.3	2.7	2.9	-1.6	5.0	3.8	3.6	.2
EEC	4.3	4.6	3.6	-.2	4.3	5.0	3.9	1.2

Sources: OECD, National Accounts of OECD Countries (1962-1973), Vol. I, II; National Accounts of OECD Countries (1974), Vol. I; National Accounts of OECD Countries (1975), Vol. I and II.

Table 3-17 (continued)

Government Final Consumption Expenditure				Gross Fixed Capital Formation			
1962-1967	1968-1972	1964-1975	1973-1975	1962-1967	1968-1972	1964-1975	1973-1975
7.4	5.9	7.1	9.0	7.5	8.4	10.8	15.7
6.9	6.0	7.3	12.1	9.9	11.4	5.0	-13.6
5.4	6.3	5.7	4.8	10.9	7.0	6.7	.4
6.6	6.4	8.8	16.3	10.4	13.1	3.0	-22.2
6.1	6.1	5.9	5.7	12.0	12.5	9.2	-6.6
3.3	5.2	4.0	4.2	2.1	7.6	1.9	-6.2
3.9	3.6	3.2	1.5	1.5	1.9	2.1	-4.9
7.0	-.4	2.5	1.9	4.8	2.8	1.3	-9.9
3.3	3.9	3.5	3.4	4.8	5.5	3.1	-3.8

consumption. The increase in money supply was the lowest between 1963 and 1967; so was private consumption. The same relationship between money supply and rate of inflation may be inferred in Table 3-18. In summary, the objective of the policy makers to cause the people to refrain from consumption in favor of holding more money has been self-defeating in the experience of Turkey, where people preferred goods in favor of money when the purchasing power of money was declining.

If the policy makers were able to develop an organized market for primary securities such as common stock, mortgages and bonds, incentives to refrain from current consumption might follow. By doing that, not only government but also potential investors would be able to borrow funds from operating capital markets to finance their projects without depending on their "self-finance." It is estimated that about 61 percent of private investment was financed by self-finance of the investors, 38 percent was financed by the banking system and only one percent was financed by the sale of bonds.[1] The government was unable to break the confines of self-finance and channel the internal funds to large and small investors who could have earned high-marginal and intra-marginal rates of return. To do that, steps had to be taken to monetize the economy of the country where the savers could respond to high real returns by increasing

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[1]Edmond Asfour, Turkey: Prospects and Problems of an Expanding Economy, p. 87.

Table 3-18

Annual Rate of Change in Private and Public Consumption, Money Supply, and Prices

	1963-1967	1968-1972	1973-1975
Annual Rate of Change in Private Consumption	3.9	7	7.6
Annual Rate of Change in Government Consumption	7.4	6.0	9.0
Annual Rate of Change in Money Supply	15.7	18.7	30.6
Annual Rate of Change in Prices	5.1	11.4	22.2

Sources: Changes in consumption taken from National Accounts of OECD Countries (1962-1973) and National Accounts of OECD Countries (1975); Changes in money supply from Table 3-20; Annual rate of change in prices, the GNP Implicit Price deflator from Table 3-1.

their holdings of money and near-monies to the level which is considered optimal. The low ratios of money to GNP in less industrialized countries bear witness to the lack of monetization and saving in the economy.[1] The money aspect of the economy is the subject of the next section.

Financial System and Monetary Policy

The financial system of Turkey, unlike the industrialized countries, consists almost exclusively of deposit banks and specialized development banks. Since there is little direct contact between the primary borrower and the ultimate lender, indirect financing through the monetary mechanism is the main circulation of the financial sector, which itself is quite limited. Therefore, in analyzing the demand for money, it is quite reasonable to define a broader definition of money which includes interest and non-interest bearing deposits of the banking system, and currency which is the only financial asset available to wealth holders. In industrialized economies, on the other hand, the individual has the option to hold many available financial assets, some of which may be fairly close substitutes for money.[2] With a high rate of inflation and uncertainty about the future, however, no other financial asset other than money can be

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[1] Ronald I. McKinnon, Money and Capital in Economic Development, p. 69.

[2] Ibid., p. 38.

easily marketed. For this very reason, "money's role as a means of payment, and its sanction by the state, greatly enhance its value as an instrument of private capital accumulation." Nevertheless, money's usefulness as a financial instrument depends on the individual's desire to demand it. Even holding money is risky. When the rate of inflation increases, less of it will be demanded, assuming other variables do not change substantially and less financial growth occurs. Therefore, the monetization in the economy is a good indication of successful financial growth, which can be shown as the ratio of money to GNP.[1] From these measures, Turkey's financial sector has not shown as much progress as expected.

Nevertheless, M_3, money and quasi-money (i.e., currency in circulation and total deposits) has grown from 21 percent of GNP in 1949 to 34 percent in 1970 and declined to 31.7 percent in 1976 (see Table 3-19). The process of monetization in the economy increased as the country reduced the share of agriculture from 44.2 percent of the Gross Domestic Product in 1949 to about 23.8 percent in 1976. In the same manner, the share of currency decreased from 60.1 percent of money supply, M_1, in 1949 to 27.7 percent in 1976. The demonetization process after 1970 can be attributed to nothing but the high rate of inflation. In other words, people reduced their holdings of money and quasi-money in order to

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[1]McKinnon, p. 69.

Table 3-19

Financial Structure of Turkey, 1949-1976
Monetary and GNP Data in Billions of Current Turkish Liras

Year	Money Supply (M_3) Currency	Demand Deposits	M_1	Time* and Saving Deposits (T)	$M_2=(M_1+T)$	Other Deposits, t**	Total $M_3=M_2+t$
1949	.847	.563	1.410	.146	1.556	.367	1.923
1950	.900	.694	1.594	.180	1.774	.504	2.277
1951	1.048	.970	2.018	.183	2.201	.588	2.789
1952	1.146	1.275	2.421	.155	2.576	.728	3.304
1953	1.333	1.614	2.947	.235	3.182	.946	4.128
1954	1.379	1.993	3.372	.245	3.617	.945	4.562
1955	1.805	2.409	4.214	.297	4.511	1.142	5.653
1956	2.322	3.039	5.361	.336	5.697	1.376	7.073
1957	2.936	3.931	6.867	.395	7.262	1.761	9.023
1958	3.052	4.369	7.421	.452	7.873	1.929	9.802
1959	3.406	5.293	8.699	.533	9.232	2.629	11.861
1960	3.828	5.428	9.256	.788	10.044	3.027	13.071
1961	4.140	5.885	10.025	1.093	11.118	2.860	13.978
1962	4.527	6.437	10.964	1.161	12.125	3.443	15.568
1963	4.926	7.241	12.167	1.571	13.738	3.337	17.075
1964	5.835	8.164	13.999	1.798	15.797	3.337	19.134
1965	6.326	10.108	16.434	2.651	19.085	2.986	22.071
1966	7.164	12.616	19.780	3.662	23.442	2.972	26.414
1967	8.714	13.968	22.682	4.419	27.101	3.508	30.609
1968	8.237	17.731	25.968	5.430	31.398	4.165	35.563
1969	9.081	21.046	30.127	6.439	36.566	4.452	41.018
1970	11.850	23.418	35.268	8.903	44.171	6.238	50.409
1971	13.917	29.670	43.587	13.071	56.658	8.063	64.721
1972	15.978	37.275	53.253	18.251	71.504	9.430	80.934
1973	20.700	49.826	70.528	20.808	91.336	12.159	103.495
1974	26.151	63.894	90.045	24.978	115.023	13.090	128.113
1975	32.905	85.565	118.470	30.375	148.845	19.120	167.965
1976	41.653	108.864	150.517	34.190	184.707	25.842	210.549

Table 3-19 (continued)

GNP	Ratio of M_2 to GNP	Ratio of M_3 to GNP
90.54	.172	.212
96.94	.183	.235
11.64	.189	.240
13.39	.193	.247
15.61	.204	.264
15.91	.227	.286
19.12	.236	.296
22.05	.258	.321
29.31	.248	.308
35.00	.225	.280
43.67	.211	.272
46.66	.215	.280
49.54	.224	.282
57.59	.211	.270
66.80	.206	.256
71.31	.222	.268
76.73	.249	.288
91.42	.256	.289
101.48	.267	.302
112.50	.279	.316
124.90	.293	.328
147.78	.300	.341
192.60	.294	.336
240.81	.297	.336
309.83	.295	.334
427.10	.269	.300
535.71	.278	.314
664.34	.278	.317

(*) IMF definition of time and saving deposits (T)

(**) t = Government time and saving deposits and frozen savings in the banks and Central Bank.

Sources: Money Supply and its components from Monthly Bulletin (January-February, 1977) and Annual Report of Central Bank of Turkey (1976); Gross National Product from State Institute of Statistics reported in National Income and Expenditure of Turkey (1948-1972), (1962-1973) and International Monetary Fund, International Financial Statistics, various issues.

protect themselves against rapid decrease in their purchasing power. Even the rate of increase of money supply by any definition (M_1, M_2, M_3) has been above 23 percent per year since 1971 (see Table 3-20). This policy of expansion of money supply indeed induced a reduction in monetization processes. Furthermore, the government, by decree, reduced deposit interest rates in the 6 to 24 month maturity range by one percentage point in 1973, causing a fall in holding time and saving deposits, T. Time and saving deposits, T, declined from 34.3 percent of money supply, M_1, in 1972 to 22.7 percent in 1976. The high rate of increase in foreign exchange deposits between 1970 and 1972 forced the government to reduce its dependence on that source for foreign exchange, which was the reason for the above decision. Faced with the lack of foreign exchange, the government again reinstituted the foreign exchange deposit scheme in May, 1975 with a 1.75 percent net interest rate above the current European interbank rate for the currency deposited in order to attract workers' savings abroad. The government guaranteed the original rate of exchange for these deposits. Commercial banks transferred all foreign exchange to the Central Bank and, in turn, received 75 percent of it in Turkish Lira. Even with 25 percent reserve requirements, the commercial banks can then lend this money,[1] which is one of the recent sources of

[1]Betty Slade Yaser, "Why Banks Talk Turkey," Euromoney, March 1977, pp. 105-106.

Table 3-20

Percent Increase in Money Supply
and its Components Over Previous Year

Year	c	d	M_1=C+d	T	t	M_2=M_1+T	M_3=M_2+t
1950	6.3	23.3	13	23.3	37.1	14.	18.4
1951	16.4	39.8	26.6	1.7	16.9	24.1	22.5
1952	9.4	31.4	20.0	-15.3	23.8	17.0	18.5
1953	16.3	26.6	21.7	51.6	29.9	23.5	24.9
1954	3.5	23.5	14.4	4.3	-.1	13.7	10.5
1955	30.9	20.9	25.	21.2	20.8	24.7	23.9
1956	28.6	26.2	27.2	13.1	20.5	26.3	25.1
1957	26.4	29.4	28.1	17.5	28.0	27.5	27.6
1958	4.0	11.1	8.1	14.4	9.5	8.4	8.6
1959	11.6	21.1	17.2	17.9	36.3	17.3	21.0
1960	12.4	2.6	6.4	48.8	15.1	8.8	10.2
1961	8.2	8.4	8.3	38.7	-5.5	10.7	6.9
1962	9.3	9.4	9.4	6.2	20.4	9.1	11.4
1963	8.8	12.5	11.0	35.3	-3.1	13.3	9.7
1964	18.5	12.7	15.1	14.4	0	15.	12.1
1965	8.4	23.8	17.4	47.4	-10.5	20.8	15.3
1966	13.2	24.8	20.4	38.1	-.5	22.8	19.7
1967	21.6	10.7	14.7	20.7	17.9	16.3	15.9
1968	-5.5	26.9	14.5	22.9	18.7	15.9	16.2
1969	10.2	18.7	16.0	18.6	6.9	16.5	15.3
1970	30.5	11.3	17.1	38.3	40.1	20.8	22.9
1971	17.4	26.7	23.6	46.8	29.3	28.3	28.4
1972	14.8	25.6	22.2	39.6	16.9	26.2	25.1
1973	29.5	33.7	32.4	14.0	28.9	27.7	27.9
1974	26.3	28.2	27.7	20.0	7.6	25.9	23.8
1975	25.8	33.9	31.6	21.6	46.1	29.4	31.1
1976	26.6	27.2	27.1	12.6	35.2	24.1	25.4
		c	d	M_1	T	t	M_2	M_3
Average 1950-1976		15.9	21.9	19.1	23.5	18.	19.6	19.2

Source: Table 3-19.

inflation in the economy. Although with these generous incentives to the workers, the money supply, M_2, was just about 27.8 percent of the GNP in 1976. In other words, with the high rate of inflation in Turkey, workers preferred to deposit their approximately $6 billion remittances in Germany.[1] Nevertheless, the government's treatment of workers' remittances as perfect substitutes for foreign savings with no regard for their inflationary impact has slowed down the monetization of the economy.

The relative position of Turkey with respect to other countries is seen in Table 3-21. The ratio of M_2 to the GNP increased from .18 in 1950 to about .28 in 1976 in Turkey. The United States' money supply, M_2, on the other hand, increased from 65 percent in 1950 to 76 percent in 1976; Japan's increased from 57 percent in 1953 to 116 percent in 1976; Taiwan's increased from 9 percent in 1951 to 68 percent in 1976; Korea's increased from 7 percent in 1953 to 34 percent in 1976, respectively. Taiwan and Korea have been successful in obtaining a higher rate of monetization with fiscal and monetary policies which encouraged the accumulation of time and saving deposits in the hands of the people. Their incentives to induce people to hold more money and quasi-money has not only increased the rate of domestic saving, but also caused a higher rate of economic growth, relative price stability, and expansionary growth in their exports. A

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[1]Ibid., p. 105.

Table 3-21

The Ratio of the Money Supply (M_2) to Gross National Product in Turkey and Some Industrialized and Less Industrailized Countries, 1950-1976

Year	Turkey	United States	Japan	Taiwan	Chile	Korea	Brazil	Argentina
1950	.18	.65						
1951	.19	.60		.09				
1952	.19	.61		.11			.30	.42
1953	.21	.61	.57	.11		.07	.28	.45
1954	.23	.64	.59	.13		.09	.30	.5
1955	.24	.62	.63	.13	.10	.09	.25	.48
1956	.26	.62	.69	.14	.06	.09	.24	.44
1957	.25	.61	.69	.15	.09	.09	.27	.42
1958	.22	.65	.80	.20	.10	.11	.27	.41
1959	.21	.63	.86	.20	.12	.12	.27	.29
1960	.21	.63	.88	.19	.15	.10	.28	.28
1961	.22	.66	.89	.25	.15	.14	.28	.23
1962	.21	.67	.87	.27	.18	.15	.27	.21
1963	.20	.69	.95	.31	.15	.11	.24	.22
1964	.22	.71	.93	.34	.15	.09	.23	.23
1965	.25	.71	.98	.35	.16	.12	.26	.21
1966	.26	.68	.99	.39	.16	.15	.21	.22
1967	.27	.71	.96	.42	.16	.20	.24	.26
1968	.28	.71	.94	.40	.17	.27	.24	.29
1969	.29	.66	.98	.42	.17	.34	.24	.29
1970	.30	.70	.97	.45	.18	.35	.20	.30
1971	.29	.73	1.10	.50	.26	.47	.20	.29
1972	.30	.76	1.17	.56	.35	.38	.22	.26
1973	.30	.75	1.13	.57	.40	.40	.23	.30
1974	.27	.75	1.10	.53	.22	.36		.36
1975	.28	.76	1.14	.64		.34		.34
1976	.28	.76	1.16	.68		.34		

Source: International Monetary Fund, International Financial Statistics, various issues.

successful switch from commodities to money has been achieved in Taiwan and Korea, which created a price stability even with the expansionary monetary policy. However, the story of Chile, Brazil and Argentina with their controlled rate of interest most of the time tells us the switch from money to commodities by the people as a result of monetary and fiscal policy. Even in these economies, people would switch to money, time and saving deposits if the nominal interest rate were raised. As a matter of fact, in the late 1960's, Chile increased the nominal rate of interest to 20 percent on some deposits, which induced a rise in M_2 from 16 percent of the GNP in 1967 to 40 percent of the GNP in 1973. However, the high rate of inflation and uncertainty caused the percentage to drop to 22 percent in 1974.

Proper Variables

Money

However, for our analysis concerning the demand for money hypothesis, the three definitions of money are chosen in this study for these reasons: first of all, the definitions of M_1 (currency plus sight-demand deposits) and M_2 (M_1 plus time and saving deposits) correspond to official definitions of money in most of the countries and by the International Monetary Fund. Secondly, the definition of quasi-money by the Organization for Economic Cooperation and Development includes government deposits in the banks and

Central bank as part of the ingredients of the monetary total, M_3 (currency plus deposits), which is important for the monetary policy of the government. Governmental policy and institutional factors have caused a fast growth of money supply since 1950. M_1 (currency plus sight-demand deposits) grew 19.1 percent, M_2 (M_1 plus time and saving deposits) grew 19.6 percent, M_3 (M_2 plus official and frozen deposits in the banks and the Central Bank) grew 19.2 percent per year during the 1950-1976 period. The cause of this high rate of supply of money has been deficit financing, credit policy of the Central Bank, and, in recent years, workers' remittances from abroad.

Table 3-19 shows the total money supply for each definition of money and their components for the end of each year. Percentage increases in the different definitions of money supply and their components can be observed in Table 3-20, which gives a good idea about the different rate of growth in each component and their relative importance in the total. Moreover, the formulation of a demand function for these different definitions of money would be of great importance in analyzing past monetary policy as well as in formulating proper monetary policy in the future.

Gross National Product

It is hypothesized that the individual's demand for money is related to his wealth. However, data are not available to test this variable. Nevertheless, proper

specification and use of aggregate income as a proxy for total wealth would serve the purpose to estimate a demand function for money.

In choosing aggregate income, it is indicated that the trade deficit has widened and dependence on remittances of workers has increased. Facing a high rate of inflation and an over-valued currency, workers withheld their remittances. The workers' remittances decreased from $1,449.3 million in 1974 to $968.3 million in 1976 (see Appendix 3-3). The dependence of the country on outside resources cannot continue. This dependence can be reduced by increasing export earnings, and devaluation of over-valued currency. In other words, import surplus cannot be continuous and money holders would base their decision on their aggregate income. It is the contention of this study that individuals are more influenced by current income than permanent income and that current GNP could be the best proxy for wealth which determines the demand for money in less industrialized countries. Silveira's analysis for Brazilian economy confirms this contention.[1] Nevertheless, a distributed lag model of the GNP will be used in order to find out the impact of "permanent income" on the money holders. The criteria for "permanent income" is to try several weighting schemes and choose the one that yields the best statistical

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[1]Antonio M. Silveira, "The Demand for Money: The Evidence from the Brazilian Economy," Journal of Money, Credit and Banking, February 1973, pp. 113-140.

prediction and explanation of the demand for money in the economy of Turkey.

The Cost of Holding Money

The actual cost of holding any asset is opportunity foregone in doing so. In the absence of inflation, the rate of interest measures this alternative cost. However, in the presence of inflation, in addition to the cost of holding money there is the rate at which the value of money is expected to decline.[1]

Without controls on interest rates, the two components of the cost of holding money--alternative interest foregone and loss of purchasing power--are reflected within the "nominal" interest rate. If there were a free capital market, the yield on a long-term bond could have been used to represent the cost of holding money in the monetary studies.

In an economy such as Turkey's where the rate of inflation was 10.2 percent between 1950 and 1976, and 19.4 percent between 1971 and 1976 per year on the average, the "free market" rate of interest would have exceeded the 11.5 percent maximum lending interest rates on short-term credits and 3 percent maximum interest rates on deposits (see Table 3-22 and Appendix 3-4). The policy of the government has been to keep interest rates below the market equilibrium rate; in

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[1]John V. Deaver, "Chilean Inflation and the Demand for Money," in David Meiselman, ed., Varieties of Monetary Experience, p. 25.

Table 3-22

Maximum Interest Rates on
Deposits (In annual percentages)

	1961	1970	1973	1974
Deposits with Banks				
Sight deposits				
Saving	3.0	3.0	2.5	3
Commercial	2.0	1.0	0.0	2
Official	2.0	1.0	0.5	1
Interbank	2.0	1.0	(free)	(free)
Time deposits				
4 to 6 months	4.0	4.0	4.0	(1)
6 months to 1 year	5.0	6.0	4.0	6 (1)
1 year to 18 months	6.0	9.0	7.0	9 (2)
more than 18 months	6.5	9.0	9.0	(3)

/1 3 months to 1 year
/2 1 to 2 years
/3 Over 2 years
Source: Monthly Bulletin, January-February, 1977, and other issues.

fact, the government reduced interest rates in early 1973, but again raised them to the 1970 level in 1974, but since then no change has taken place. The aim of the government, however, is to reduce cost to borrowers and to widen the gap between the lending rates and deposit rates in order to increase the profitability of the banks to lend credit to the projects indicated in the plans. In practice, however, the banks have been able to evade the interest ceilings by charging a variety of commissions and requiring compensating deposits. The actual cost of the credits, however, is not reduced to the borrowers. Moreover, credits based on collaterals discriminate against the people who do not have property and wealth. In other words, implication of monetary policy widens the income distribution. Moreover, the wide spread between the rate of interests on credits and deposits has made it possible for the banks to compete strongly for deposits by excessive advertising and expansion of many branches, even on the same streets, with tremendous waste and inefficiency. The number of bank branches was 4,841 at the end of 1976. There was about a 5.6 percent increase over the previous year.[1] Since 1, 2 or 3 percent maximum ceilings on deposits, as shown in Table 3-22, and the price inflation, the depositers in Turkey have earned a negative real rate of return on both sight and time deposits from

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[1]Central Bank, Annual Report (1976), p. 63.

1950 up until now. Thus the rate of interest is not a proper variable in the specification of the demand for money, since it is rigidly controlled and unrepresentative of economic relationships.

Price controls and high rates of inflation not only distort the terms of trade of internal markets but also worsen the terms of trade between exports and imports. The government policy of attempting to keep the prices of goods and services sold by the State Economic Enterprises stable without attention to reduce waste and inefficiency has been contributing to large deficits in these enterprises. This reduces the rate of public investment. Large deficits, in return, have to be financed with credits from the Central Bank, which, in its part, accelerates the rate of inflation. For instance, most of the goods and services of the State Economic Enterprises did not rise in 1976. For this reason, the consumer price index showed a rise of just 17.4 percent in 1976. However, in the middle of 1977, faced with a chronic balance of trade deficit (see Appendix 3-3) and unduly dependent on foreign financial resources, the government devalued Turkish currency 10 percent and imposed big price increases on basic goods and services in an attempt to prevent an economic crisis. Electricity prices went up by 43 percent; fuel oil for heating, by 42 percent; cement, by 70 percent; petrol, by 96 percent; and local telephone calls by 150 percent. The inflation rate for 1977 would not be

less than 25 percent for the consumer price index.[1]

In an economy such as that of Turkey in spite of a variety of price controls, the rate of inflation has been about 19.7 percent per year on the average between 1971 and 1976. When this is the case, thus the rate of inflation is "the main observable variable that affects the yield on monetary assets relative to the yields on alternative assets. . . . The rate of inflation indicates not only the relative yield on monetary assets but also the risk associated with holding money."[2]

In this study, however, we will follow the above logic to test the significance of rate of inflation on the demand for money (time and saving deposits inclusive). Moreover, we will test the demand for money hypothesis for the expected rate of inflation.

In the next chapter, we will test our main hypothesis; that is, the demand for money as a function of rate of inflation and aggregate income for the years between 1950 and 1976.

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[1] London Times, September 10, 1977.

[2] Robert C. Vogel and Stephen A. Buser, "Inflation, Financial Repression, and Capital Formation in Latin America," in Ronald I. McKinnon, ed., Money and Finance in Economic Growth and Development (New York: Marcel Dekker, Inc., 1976), p. 53.

CHAPTER IV

THE DEMAND FOR MONEY: EMPIRICAL RESULTS

> The Turkish government is moving against [the black] markets to encourage Turkish workers to repatriate their earnings in cash rather than in luxury goods for resale.
>
> --The Wall Street Journal, March 27, 1978, p. 6.

> We all hasten to get rid of any commodity which, like ripe fruit, is spoiling on our hands. Money is no exception. . . .
>
> --Irving Fisher, Purchasing Power of Money, p. 63.

The purpose of this chapter is to analyze empirically the demand for money in the Turkish economy for the period 1950-1976. During this period (a) real income rose 6.4 percent on the average; (b) the current GNP rose almost 17 percent per year; (c) the average rate of price increase was approximately 9.9 percent; (d) the rate of money supply on the average was 18.4 percent per year; (e) the average rate of increase in money stock per unit of output was 11.3 percent per annum; (f) the velocity showed an average decrease of approximately 1.2 percent per year on the average; and (h) the population increased 2.6 percent per year on the average. Figures 1 and 2 and Appendices 4-1 to 4-10 are themselves self-explanatory in showing the important changes in some of the above variables during this period of time.

FIGURE 1

Index Numbers of Nominal Stock of Money, Nominal Gross National Product, and Price Level, 1949-1976 (1968 = 100)

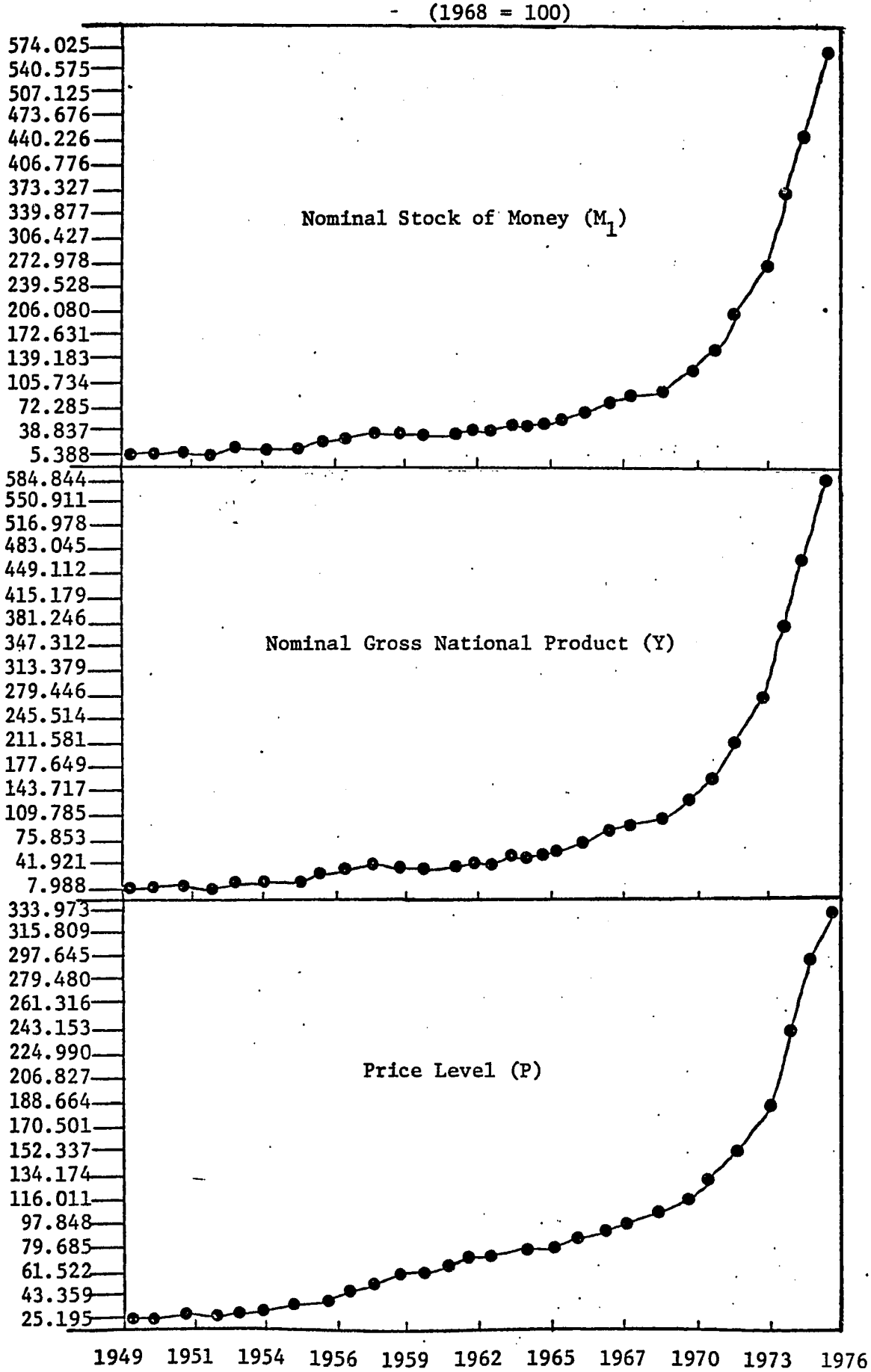
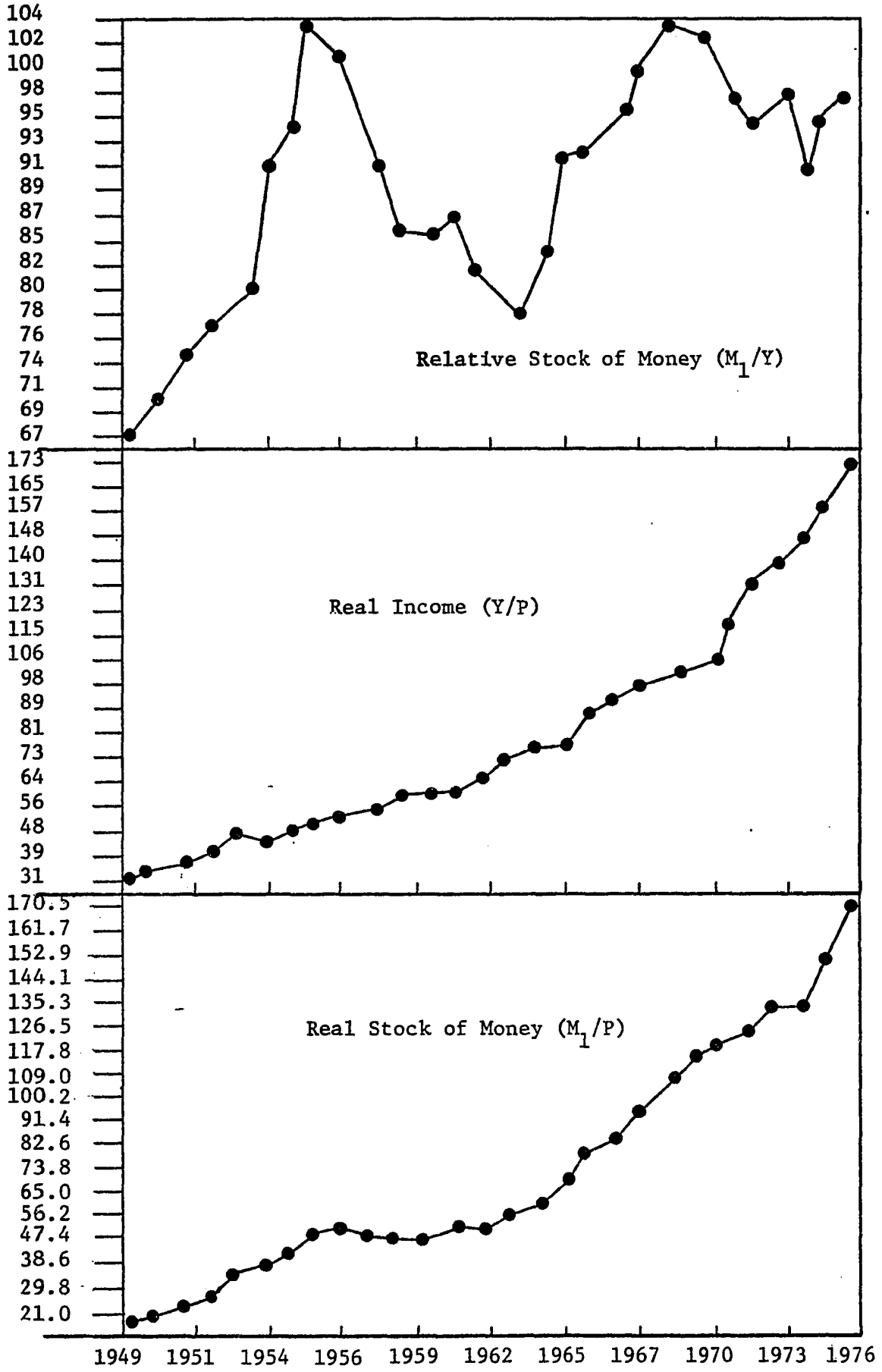


FIGURE 2

Index Numbers of Relative Stock of Money, Real Income and Real Stock of Money, 1949-1976
(1968 = 100)



The above news item gives a common sense touch for our empirical analysis. The workers' remittances, says the news item, plummeted to the lowest point. They prefer to hold their savings in terms of foreign currency, nonperishable and luxury goods. When they do refrain from sending their earnings home in terms of foreign exchange, it creates a condition where even the Central Bank is unable to find foreign exchange to pay for the previously ordered printing machines abroad.[1] The high rate of inflation has made the people substitute their cash holdings with goods, land and properties. The government has attempted to close all semi-legal black markets in order to convince the workers "to repatriate their earnings in cash rather than in luxury goods for resale."

The Estimation Results

The general form of the equations fitted in this study are the following:

$$\ln \left(\frac{M}{P}\right) = a_o + a_1 \ln y + a_2 \dot{P} \text{ (or } \Delta P) + V \quad (1)$$

$$\ln \left(\frac{M}{P}\right) = a_o + a_1 \ln y_P + a_2 \dot{P}E \text{ (or } \Delta P) + V \quad (2)$$

$$\ln \left(\frac{M}{PN}\right) = a_o + a_1 \ln (y/N) + a_2 \dot{P} \text{ (or } \Delta P) + V \quad (3)$$

$$\ln \left(\frac{M}{PN}\right) = a_o + a_1 \ln y + a_2 \dot{P}E + V \quad (4)$$

$$\ln \left(\frac{M}{P}\right) = a_o + a_1 \ln y_P + a_2 \dot{P} + V \quad (5)$$

$$\ln \left(\frac{T}{P}\right) = a_o + a_1 \ln y + a_2 \dot{P} + V \quad (6)$$

$$\ln \left(\frac{t}{P}\right) = a_o + a_1 \ln y + a_2 \dot{P} + V \quad (7)$$

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[1] Charles Meynell, "Turkey's Crisis: The Euromarket's Biggest Problem," Euromoney, March 1978, pp. 32-37.

where: $\frac{M}{P}$ = real cash balances for different definition of money

M_1 = currency plus sight-demand deposits

M_2 = M_1 plus time and saving deposits, T

M_3 = M_2 plus government deposits and controlled deposits in the banks and Central Bank, t

$y = \frac{GNP}{P}$ = measured income

y_P = permanent income

N = population

$\dot{P}$ = rate of inflation

ΔP = the change in price level

$\dot{PE}$ = expected rate of inflation

a_1 = income elasticity of demand for money

a_2 = coefficient of cost of holding money

First we tested equations (1) and (3) for the entire period and equation (1) for sub-periods for different definitions of money by using current income and rate of inflation as explanatory variables. Table 4-1-A-B and 4-2 summarize the finding of the test by using the Cochrane-Orcutt method in estimating the equations. Since the results of estimation by Hildreth-Lu Scanning technique, generally, does not differ from the above procedure, we do not list them in the tables.

Secondly, we wanted to find out the influence of the distributed lag of measured income, the distributed lag of current rate of inflation or the change in price level, and current income as dependent variables in equations (2) and

Table 4-1A

Estimated Parameters of Equation (1)
(t-Values Are in Parentheses)

Year	Dependent Variable	Income Variable	a_1	Variable Used for Cost of Holding Money	a_2	R^2	D.W.	ρ	SER
1951-76 (n=26)	$\ell n(M_1/P)$	ℓn y	1.0477 (9.11)	Δ P	-.002 (-1.09)	.99	1.30	.773	.0508
1951-66 (n=16	$\ell n(M_1/P)$	ℓn y	.673 (2.683)	Δ P	-.001 (-.22)	.962	.957	.779	.0571
1960-76 (n=17	$\ell n(M_1/P)$	ℓn y	1.1677 (10.53)	$\dot{P}$	-.0026 (-1.14)	.9877	1.5768	.66877	.0456866
1960-76 (n=17)	$\ell n(M_1/P)$	ℓn y	1.347 (14.57)	Δ P	-.0041 (-2.72)	.990	1.6677	.41966	.0411946
1963-76 (n=14)	$\ell n(M_1/P)$	ℓn y	.855 (3.45)	Δ P	-.0022 (-1.49)	.987	1.74	.866	.0404
1963-76 (n=14)	$\ell n(M_1/P)$	ℓn y	.3695 (1.21)	$\dot{P}$	-.0032 (-1.53)	.988	1.71	.919	.0382
1967-76 (n=10)	$\ell n(M_1/P)$	ℓn y	1.144 (10.78)	Δ P	-.003 (-2.595)	.987	2.13	.201	.02567
1967-76 (n=10)	$\ell n(M_1/P)$	ℓn y	.9707 (11.96)	$\dot{P}$	-.004 (-2.15)	.984	2.39	.396	.02799

Table 4-1B

Estimated Parameters of Equation (2)
(t-Values Are in Parentheses)

Year	Dependent Variable	Income Variable	a_1	Variable Used for Cost of Holding Money	a_2	R^2	D.W.	ρ	SER
1950-76 (n=27)	ℓn (M_2/P)	ℓn y	.7819 (3.23)	Δ P	-.002 (-1.4)	.993	.978	.943	.0502
1951-66 (n=16)	ℓn (M_2/P)	ℓn y	.7584 (2.24)	Δ P	-.003 (-.509)	.962	.914	.852	.0618
1967-76 (n=10)	ℓn (M_2/P)	ℓn y	.8568 (6.58)	Δ P	-.003 (-4.22)	.994	1.87	.803	.0182
1950-76 (n=27)	ℓn (M_3/P)	ℓn y	1.0415 (7.12)	Δ P	-.0024 (-2.02)	.994	1.3	.873	.0442
1951-66 (n=16)	ℓn (M_3/P)	ℓn y	.7365 (3.39)	Δ P	-.002 (-.50)	.973	1.13	.791	.0476
1967-76 (n=10)	ℓn (M_3/P)	ℓn y	.9726 (6.4)	Δ P	-.0035 (-3.78)	.991	2.16	.765	.0235

Table 4-2

Estimated Parameters of Equation (3)
(t-Values are in Parentheses)

	Dependent Variable	Income Variable	a_1	Variable Used for Cost of Holding Money	a_2	R^2	D.W.	ρ	SER
1951-76 (n=26)	$\ell n(M_1/PN)$	ℓn (y/N)	.9087 (5.28)	$\dot{P}$	-.001 (-.54)	.973	1.25	.796	.0516
1951-76 (n=26)	$\ell n(M_1/PN)$	ℓn (y/N)	.943 (4.48)	ΔP	-.0017 (-1.01)	.974	1.24	.825	.0508
1951-76 (n=26)	$\ell n(M_2/PN)$	ℓn (y/N)	.7634 (2.87)	$\dot{P}$	-.001 (-.62)	.981	1.06	.913	.0534
1951-76 (n=26)	$\ell n(M_3/PN)$	ℓn (y/N)	.9206 (4.80)	$\dot{P}$	-.001 (-.830)	.980	1.31	.8530	.0473
1951-76 (n=26)	$\ell n(M_3/PN)$	ℓn (y/N)	.8899 (3.84)	ΔP	-.0027 (-1.846)	.982	1.169	.9113	.0448

(4), respectively.

The findings in Table 4-3, Table 4-4, Table 4-5, and Table 4-6 are the results of testing equations (2) and (4). The expected rate of inflation or change in price level has been tested as an independent variable in the above equations as the cost of holding money. Further, the results of Almon-type distributed lags have been given in Table 4-7 in order to compare with the Friedman lags used in the demand-for-money equations in Tables 4-4, 4-5, and 4-6. The statistics outlined along with the estimated equations are computed t-statistics in parentheses below each estimated coefficient, Durbin and Watson d-statistic (D.W.), coefficient of determination (R^2), first-order serial coefficient (ρ), coefficient of expectation (β), and the standard error of the regression equation (SER).

A summary of Table 4-1 and 4-2 as follows:

1. Income elasticities--All equations, based on per capita income, regardless of definition of money or cost of holding money, are income inelastic for the period as a whole. However, the same thing is not true for the aggregate demand for money. In the case of the aggregate demand for money, demand for more inclusive money (M_2) in every instance is income inelastic. However, demand for less inclusive money (M_1) and all-inclusive money ($M_3 = M_2 +$ government and controlled deposits in the Central Bank and banks) are income elastic. The same argument does not hold

for a short span of time for the all-inclusive money (M_3). However, when the change in price level becomes an argument as the cost of holding money in our equation, whether the demand for less inclusive money is income elastic is not conclusive. As the t-tests suggest, coefficients of income elasticities are statistically significant at the 5 and even 2.5 percent level with the exception of income elasticity of less inclusive money (M_1) for the years 1963-1976 when $\dot{P}$ is an independent variable in the regression. Even that coefficient is significant at the 15 percent level.

2. Coefficient of cost of holding money--This coefficient is expected to be negative since it is the slope of demand, because it is the percentage change in demand with respect to arithmetic change in the cost of holding money. Moreover, the negative sign of this coefficient indicates a substitution between money and other assets. Theoretically, the more statistically significant the coefficient, the more substitution there is between money and goods. However, there is no significant theoretical and policy difference with our interpretation of the slope of the demand curve and the elasticity of the cost of holding money, for the simple reason that slope and elasticity move in the same direction.[1]

We see that the coefficient of cost of holding money

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[1]Phillip Cagan and Anna J. Schwartz, "Has the Growth of Money Substitutes Hindered Monetary Policy?," Journal of Money, Credit and Banking, Vol. VII, May 1975, p. 141.

has a smaller negative value (statistically less significant) in the earlier periods (1950-1960 or 1950-1966). For the latter periods (1960-1976 or 1963-1976), the coefficient of cost of holding money is statistically significant. For one thing, as the t-tests indicate, coefficients of cost of holding money are statistically significant at the 5 and even 2.5 percent level for the years 1967-1976, implying a wave of substitutions between money and other assets (foreign currency, goods, land, etc.). For the full period as a whole, the signs of the coefficients, regardless of definition of money or cost of holding money, are in the right direction and the corresponding t-tests are statistically significant, especially when the changes in price level is an argument for the cost of holding money.[1]

For the period as a whole, the Durbin-Watson statistics do not substantiate the existence of autocorrelation at the 1 percent level of significance for the less inclusive demand for money (M_1) and all-inclusive demand for money (M_3), but remains inconclusive for more inclusive money (M_2).

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[1] We wanted to test the impact of cost of holding money on the aggregate private consumption function. Aggregate income and inflation are the explanatory variables. Here is the estimated equation:

$$\ell n\, C_p = 5.18 + .869\, \ell n\, y + .0004\, P$$
$$\qquad\quad (20.8)\quad (22.6)\qquad\quad (1.37)$$
$$R^2 = .9977,\ D.W.\ \ 1.9159$$
$$\rho = .45809,\ SER = .0182188,\ n = 24$$

As the t-tests indicate (in parentheses), all the coefficients have the right signs, and are statistically significant at the 5 percent level. The equation supports our institutional analysis of Chapter III.

Nevertheless, for the 1960-1976 period, Durbin-Watson statistics imply that serial correlation is rejected at the 2.5 and 5 percent level tests, respectively. Our econometric model, using price change and measured income as explanatory variables, indeed predicts best the change in the demand for money. Figure 3 shows the actual and estimated demand for less inclusive money (M_1), derived from equation (1) by using aggregate income and the change in price level as independent arguments.

One of the hypotheses of our study is that the expectation of inflation seems a legitimate explanatory variable on the demand for money; however, it is defined. To test this hypothesis, we run equation (4) in which the expected rate of inflation (lagged four periods) and measured income are independent variables, respectively. The results of this argument are shown in Table 4-3. However, the summary of Table 4-3 is given below:

1. The signs of coefficients of the expected cost of holding money for all definitions of money are negative and t-statistics of all coefficients are statistically significant at the 15 percent level. For the period as a whole, however, the time and saving deposits (T) have the largest coefficient of expected cost of holding money and the t-test is statistically significant at the 1 percent level. Nevertheless, the estimated parameters of equation (4) for the 1960-1976 period indicate that the coefficient of

FIGURE 3

The Demand for Money, Derived
from Equation [1]
(←--- = actual, ——— = estimated)

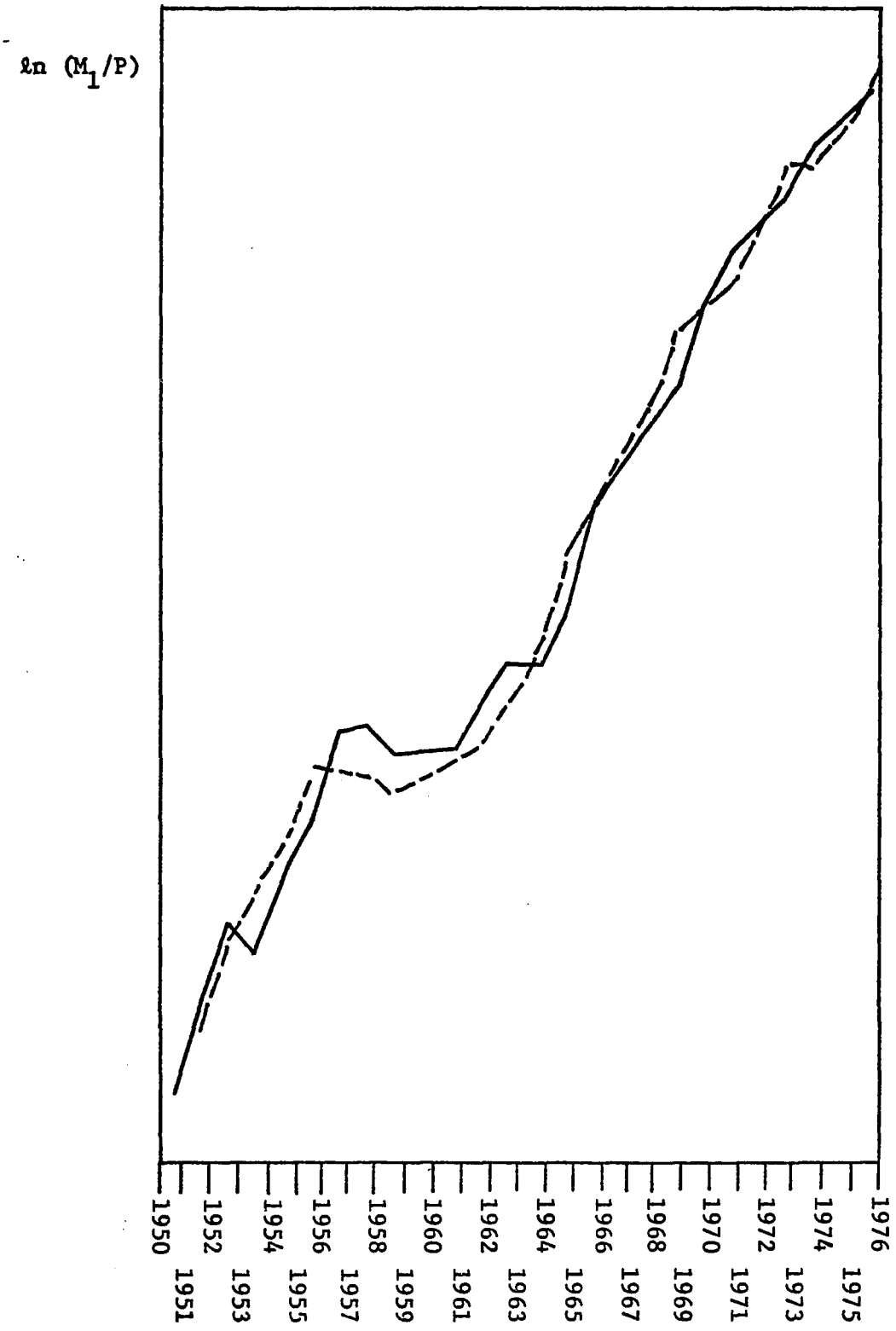

Table 4-3

Estimated Parameters of Equations (4, 6, and 7)
(t-Values Are in Parentheses)

Year	Dependent Variable	Income Variable	a_1	$\dot{PE}$	a_2	β	R^2	D.W.	ρ	SER
1952-76 (n=24)	$\ell n(M_1/P)$	ℓn y	1.013 (10.42)	$\dot{PE}$	-.004 (-.95)	.4	.9871	1.25	.73590	.0531204
1960-76 (n=17)	$\ell n(M_1/P)$	ℓn y	1.36 (14.10)	$\dot{PE}$	-.013 (-2.88)	.45	.9910	1.60	.49796	.0391336
1952-76 (n=24)	$\ell n(M_2/P)$	ℓn y	1.113 (8.39)	$\dot{PE}$	-.009 (-1.36)	.25	.9898	1.17	.81596	.0546851
1952-76 (n=24)	$\ell n(M_3/P)$	ℓn y	1.064 (11.47)	$\dot{PE}$	-.005 (-1.13)	.4	.9904	1.29	.75405	.0480414
1960-76 (n=17)	$\ell n(M_3/P)$	ℓn y	1.304 (8.86)	$\dot{PE}$	-.009 (-1.68)	.45	.9902	1.45	.69497	.0423532
1952-76 (n=24)	$\ell n(T/P)$	ℓn y	2.134 (6.60)	$\dot{PE}$	-.073 (-3.39)	.15	.9882	1.15	.84686	.116416
1960-76 (n=17)	$\ell n(T/P)$	ℓn y	.244 (.37)	$\dot{PE}$	-.009 (-.64)	.9	.9808	1.58	.90298	.115749
1952-76 (n=24)	$\ell n(t/P)$	ℓn y	.446 (3.97)	$\dot{PE}$	.014 (1.35)	.25	.8310	1.60	.48952	.104668

the cost of holding money for less-inclusive definition (M_1) is very large and statistically significant at the 1 percent level. The positive sign of government and controlled deposits at banks and the Central Bank is consistent with the behavior of officials. When the expected rate of inflation goes up, the policy makers attempt to freeze these funds. But the sign for current inflation is negative (not shown in the table).

Again, what we have seen in Table 4-3 is that for the period 1960-1976, the significance of (T) is reduced. As we see in Table 3-22 in Chapter III, the government reduced the maximum interest rates on these deposits in 1973, thus causing a relative decline in time and saving deposits in the hands of the public. Moreover, this policy reinforced the demonetization of the economy, as can be seen in Table 3-21 in Chapter III.

2. Income elasticities of demand for money--however it is defined, is greater than 1 in which expected rate of inflation and measured income are the explanatory variables. All the t-values are statistically significant at the 1 percent level. However, the income elasticity of time and saving deposits for the 1960-1976 period is inelastic and statistically less significant.

For the period under study, the Durbin-Watson statistics do not substantiate the existence of autocorrelation at the 1 percent level of significance for the all-

inclusive demand for money (M_3), but remain inconclusive for the less-inclusive money (M_1) and the more-inclusive money (M_2). However, for the years 1960-1976, Durbin-Watson statistics reject the serial correlation at the 2.5-level tests for all the estimated equations in Table 4-3. We can say that the expected rate of inflation as the variable for the cost of holding money with measured income as explanatory variables explains the changes in the demand for money better than equations (1) and (3). Nevertheless, in Tables 4-4, 4-5 and 4-6 we see the results of estimated coefficients of permanent income, lagged seven periods, as one of the independent variables in equation (2) with the expected rate of inflation or the price change. These estimated equations have the lowest standard error of regressions and the highest R-squares. That is why they are chosen for analysis. The Durbin-Watson statistics reject serial correlation at the 2.5 percent level of significance for the less-inclusive money (M_1) and for the all-inclusive money definition (M_3), but remains inconclusive for (M_2) for the period 1957-1976. Nevertheless, as is seen in Tables 4-5 and 4-6, the Durbin-Watson statistics reject the existence of autocorrelation at the 2.5 percent level of significance for the less-inclusive money (M_1), for the more-inclusive money (M_2) and for the all-inclusive money (M_3), but fail to reject for (M_2) for the years 1960-1976 in which the expected rate of inflation is one of the explanatory

variables. However, the test for the existence of autocorrelation for (M_2) at the 2.5 percent level of significance stays inconclusive in which the change in price level is the argument for one of the independent variables in the equation.

The existence of autocorrelation in the equations, listed in Table 4-7, which is estimated by using Almon lags with the Cochrane-Orcutt Procedure, is rejected at the 1 percent level, but remains inconclusive for equation (5).

Nevertheless, the estimated results of equations in Tables 4-4, 4-5, 4-6, and 4-7 are summarized below:

1. A test of the permanent income argument for the demand-for-money in Turkey, as the t-values indicate, is statistically significant at the 1 percent level for all the estimated equations with the exception of coefficient of equation (3) in Table 4-7 which is statistically significant at the 10 percent level. However, the sign of time and saving (T) elasticity has changed and became insignificant for the 1967-76 period in which the institutional arrangements and consumption behavior made saving a liability. A relatively small coefficient of expectation ($\beta = .15$) provided us with the smallest standard error of regressions and the highest R-squares in the estimated equations in Tables 4-4, 4-5 and 4-6.

One point that can be seen is that the permanent income hypothesis has reduced the standard error of the regressions, but created no improvement in the R-squares

for the more-inclusive money (M_2) and the all-inclusive money (M_3). In other words, slightly higher or the same R-squares are obtained for M_2 and M_3 in which the measured income and the change in price level are the explanatory variables in Table 4-1B.

Another point is that the permanent income elasticities of money have been decreasing and are above the unity with the Friedman-type permanent income estimations for all the definitions of money with the exception of M_2 in which the change in price level is one of the independent variables for the 1967-76 period.

Furthermore, the lowest standard error of regressions is obtained in our estimations in which the permanent income is the relevant variable. This indicates that even in a fragmented economy the relevant income variable may be permanent income rather than measured income. It may imply that in the economy of Turkey real cash balances may be uncorrelated with the transitory component of income. Our tentative estimation results in Tables 4-4, 4-5 and 4-6 support the above contentions.[1]

2. <u>One of the advantages and by-products</u> of using permanent income in the demand-for-money equations is the

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[1]Nevertheless, when we use Almon-type distributed lags, estimated with Cochrane-Orcutt iterative technique, we find the income elasticities to be below unity and relatively lower R-squares and higher standard error of regressions with larger errors in prediction (see Table 4-7). Thus, Almon-type distributed lags are not relevant for our model.

generally higher t-values for the coefficients of the cost of holding money.[1]

The coefficients of the cost of holding money for the period as a whole, as the t-values indicate, are larger in which the changes in price is the argument for the cost of holding money. All the coefficients are statistically significant at the 5 percent level of confidence whether the expected rate of inflation or the change in price level is an argument for the cost of holding money for all the definitions of money. Nevertheless, t-values of the coefficients of the cost of holding money are higher for the more-inclusive money (M_2) definition for the whole period (see Table 4-4). In other words, the saving and time deposits (T), part of the more inclusive definition of money (M_2), were more sensitive to the rate of inflation in the early years of the period. However, the coefficient of the cost of holding money for the less-inclusive money (M_1) demand became more important than for the larger definitions of money (M_2 or M_3) in recent years. Nevertheless, as the t-values suggest, all the coefficients are statistically significant at the 1 percent level of confidence (see the t-values in the parentheses for the coefficient of cost of holding money, a_2, in Table 4-5).

Furthermore, the largest coefficient (statistically the most significant) of the cost of holding money is obtained for the less inclusive demand for money (M_1) in which the expected rate of inflation is an argument which

[1]The same thing is true for Chile. See Deaver, "The Chilean Inflation and the Demand for Money," pp. 10-34.

Table 4-4

Estimated Parameters of Equation (2)
(t-Values Are in Parentheses)

Year	Dependent Variable	Income Variable	a_1	Variable Used for Cost of Holding Money	a_2	β	R^2	D.W.	ρ	SER
1957-76 (n=20)	$\ell n(M_1/P)$	$\ell n\ (y_p)$*	1.37 (13.32)	ΔP	-.0031 (-2.42)	.15	.9925	1.5670	.72866	.0373023
1957-76 (n=20)	$\ell n(M_1/P)$	$\ell n\ (y_p)$	1.3199 (12.2368)	$\dot{P}E$**	-.0144 (-2.02)	.15	.9918	1.5744	.77204	.0389859
1957-76 (n=20)	$\ell n(M_2/P)$	$\ell n\ (y_p)$	1.47846 (11.8112)	$\dot{P}E$	-.0193 (-2.409)	.15	.9926	1.1813	.78365	.0434520
1957-76 (n=20)	$\ell n(M_2/P)$	$\ell n\ (y_p)$	1.544 (12.313)	ΔP	-.00374 (-2.491)	.15	.9927	1.1371	.74400	.0431018
1957-76 (n=20)	$\ell n(M_3/P)$	$\ell n\ (y_p)$	1.32924 (12.8447)	$\dot{P}E$	-.0134785 (-1.899)	.15	.9926	1.6745	.76190	.0390733
1957-76 (n=20)	$\ell n(M_3/P)$	$\ell n\ (y_p)$	1.41868 (14.60)	ΔP	-.00356 (-2.92)	.15	.9940	1.5630	.73265	.0350182
1957-76 (n=20)	$\ell n(M_1/PN)$	$\ell n(y_p/N)$	1.5055 (8.8584)	$\dot{P}E$	-.0148 (-2.063)	.15	.9802	1.5847	.76194	.0391338
1957-76 (n=20)	$\ell n(M_2/PN)$	$\ell n(y_p/N)$	1.76626 (8.53)	$\dot{P}E$	-.0202 (-2.465)	.15	.9843	1.2004	.78554	.043879
1957-76 (n=20)	$\ell n(M_3/PN)$	$\ell n(y_p/N)$	1.52798 (9.0918)	$\dot{P}E$	-.0141 (-1.95)	.15	.9827	1.6828	.75517	.0393961
1957-76 (n-20)	$\ell n(T/PN)$	$\ell n(y_p/N)$	2.7615 (3.049)	$\dot{P}E$	-.0698 (-3.012)	.15	.9801	1.1820	.89485	.120026

*Lagged 7 periods. **Lagged 4 periods.

Table 4-5

Estimated Parameters of Equation (2)
(t-Values Are in Parentheses)

Year	Dependent Variable	Income Variable	a_1	Variable Used for Cost of Holding Money	a_2	β	R^2	D.W.	ρ	SER
1960-76 (n=17)	$\ell n(M_1/P)$	$\ell n\ (y_p)$*	1.51792 (17.20)	$\dot{P}E$**	-.033889 (-4.528)	.15	.9959	1.6725	.59927	.0264944
1960-76 (n=17)	$\ell n(M_1/P)$	$\ell n\ (y_p)$	1.46257 (20.3777)	ΔP	-.0049913 (-4.4615)	.15	.9949	1.4594	.43537	.0293835
1960-76 (n=17)	$\ell n(M_2/P)$	$\ell n\ (y_p)$	1.6664 (11.9214)	$\dot{P}E$	-.035697 (-3.1946)	.15	.9938	.7600	.64508	.0372045
1960-76 (n=17)	$\ell n(M_2/P)$	$\ell n\ (y_p)$	1.37138 (5.759)	ΔP	-.0033 (-2.554)	.15	.9941	.9499	.89441	.0363774
1960-76 (n=17)	$\ell n(M_3/P)$	$\ell n\ (y_p)$	1.51905 (10.4648)	$\dot{P}E$	-.02824 (-2.647)	.15	.9938	1.3905	.69277	.0336505
1960-76 (n=17	$\ell n(M_3/P)$	$\ell n\ (y_p)$	1.44889 (13.1618)	ΔP	-.0041 (-3.681)	.15	.9954	1.036	.75326	.0290789

*Lagged 7 periods.

**Lagged 4 periods.

Table 4-6

Estimated Parameters of Equation (2)
(t-Values Are in Parentheses)

Year	Dependent Variable	Income Variable	a_1	Variable Used for Cost of Holding Money	a_2	β	R^2	D.W.	ρ	SER
1967-76 (n=10)	$\ell n(M_1/P)$	$\ell n\ (y_p)$*	1.3968 (23.38)	$\dot{P}E$**	-.02987 (-7.951)	.15	.9961	1.9218	-.38238	.0138328
1967-76 (n=10)	$\ell n(M_1/P)$	$\ell n\ (y_p)$	1.253 (15.94)	ΔP	.00385 (-4.391)	.15	.9928	2.1439	.01588	.0187315
1967-76 (n=10)	$\ell n(M_2/P)$	$\ell n\ (y_p)$	1.03848 (4.211)	$\dot{P}E$	-.0247 (-2.66)	.15	.9886	1.7522	.81474	.0257303
1967-76 (n=10)	$\ell n(M_2/P)$	$\ell n\ (y_p)$	.926031 (5.312)	ΔP	-.00317 (-4.124)	.15	.9933	1.2358	.82307	.0197419
1967-76 (n=10)	$\ell n(M_3/P)$	$\ell n\ (y_p)$	1.16181 (4.127)	$\dot{P}E$	-.03 (-2.64)	.15	.9834	1.9831	.79460	.031210
1967-76 (n=10)	$\ell n(M_3/P)$	$\ell n\ (y_p)$	1.025 (4.9126)	ΔP	-.0037 (-3.6)	.15	.9884	1.6603	.79727	.0261177
1967-76 (n=10)	$\ell n(T/P)$	$\ell n\ (y_p)$	-.2618 (-.273)	$\dot{P}E$	.0038 (.11)	.15	.9266	1.25	.82102	.0982408

*Lagged 7 periods. **Lagged 4 periods.

Table 4-7

Estimated Parameters of Equations Using Almon Lags with Cochrane-Orcutt Procedure

Equation	Dependent Variable	Income Variable	Elasticity of Income Variable	The Coefficient of P	Total Length of Lag	Mean Lag	D.W.	R^2	SER
(1)	$\ell n(M_1/P)$	ℓn y	.295839 (6.20)	-.01456 (-2.682)	7	3	1.436	.9895	.0428002
(3)	$\ell n(M_1/PN)$	ℓn (y/N)	.0824180 (1.481)	-.01443 (-2.54)	7	3	1.3065	.9725	.0448269
(6)	$\ell n(T/P)$	ℓn y	.59509 (9.646)	-.0420287 (-2.716)	7	3	1.875	.9847	.120789
(6)	$\ell n(T/PN)$	ℓn (y/N)	.411997 (4.436)	-.042182 (-2.719)	7	3	1.8764	.9787	.120671
(4)	$\ell n(M_1/P)$	ℓn y (without lag)	.2729 (5.057)	-.01385 (-2.50)	7	3	1.4402	.9892	.0434916
(5)	$\ell n(M_1/P)$	ℓn y	.355016 (8.293)	-.270488 (-8.2934) (without lag)	7	3	1.1603	.9854	.0492463

has a t-value close to 8 for the 1967-1976 period. However, for the rest of the definitions of demand for money (M_2 and M_3), the price change as a variable for the cost of holding money provided the statistically most significant coefficients at the 1 percent level of confidence (see Table 4-6).

The economic explanation of these high negative t-values for the coefficients is that there is a significant substitution between money, however it is defined, and other assets. Furthermore, the less-inclusive demand for money (M_1) is more sensitive to the rate of inflation than other definitions. In other words, as the rate of inflation increases, the holders of the less-inclusive money (M_1 = currency plus sight-demand deposits) try to get rid of it as soon as possible or to hold to it as little as possible.

The Chow's Stability Test

Our null hypothesis is that there is no structural change in the demand for money equation over the entire period. In other words, we test the hypothesis of a stable demand for money as a function of the permanent income and the cost of holding money against the alternative hypothesis that a structural change has occurred, thus indicating that the demand for money is not a stable function of the above key variables.

We use the usual procedures for testing for a structural change as developed by Chow to test the equality

between coefficients in two sub-periods. The Chow test is defined as follows:[1]

$$\overset{\Delta}{F} = \frac{(SSE_N - (SSE_m + SSE_n))/K}{(SSE_m + SSE_n)/N - 2K}$$

where: SSE_N = Sum of the squared residuals of the regression for the whole period

SSE_m = Sum of the squared residuals of the regression for the first period

SSE_n = Sum of the squared residuals of the regression for the second period

K = The number of independent variables

N = The total number of observations.

The Chow test is an F-distribution of (K, N-2K) degree of freedom.

When the computed Chow ratio is greater than the critical table value, we reject the null hypothesis--the hypothesis that the demand for money is a stable function of the permanent income and the cost of holding money, the change in price level or the expected rate of inflation.

In our estimation, the Chow ratio for all the definitions of money and the cost of holding money is less than the critical value of F(3,14); hence we fail to reject the null hypothesis at the 5 percent level of significance. The results of Chow tests is listed in Table 4-8. Moreover, the Chow test for the demand for money (M_1) as a function of the

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[1] C. Liew and D. Kahng, The Computerized Econometric Analysis I: A User's Manual (Bureau for Business and Economic Research, University of Oklahoma, Norman, Oklahoma), pp. 28-32.

Table 4-8

Stability Tests between 1957-66 and 1967-76

	M_1	M_2	M_3
ΔP	2.13	3.10	2.08
$\dot{P}E$	3.27	2.46	2.76

Critical Values: $F_{0.95}(3,14) = 3.34$

$F_{0.99}(3,14) = 5.56$

measured income and the change in price level is less than the critical value, and thus shows a stable demand for the sub-periods 1950-1966 and 1967-1976. The estimated F-value is 1.87, which is less than the critical value, $F_{0.95}(3,20) = 3.10$. In other words, the demand for money in Turkey is not only a stable function of the permanent income and the expected rate of inflation or the change in price level, but also of measured income and the change in price level as well.

Furthermore, based on the stability test, we can choose the proper definition of money. This criterion has been laid down by Allen H. Meltzer as follows:

> The problem is one of defining money so that a stable demand function can be shown to have existed under differing institutional arrangements, changes in social and political environment, and changes in economic conditions, or to explain the effects of such changes on the function.[1]

Thus, the all-inclusive definition of money (M_3) is a proper definition for the government for the successful implementation of monetary policy.

Summary, Conclusions and Policy Implications

Our analysis views the individual's problem as a choice between alternative forms of holding wealth. The results of our empirical study indicate the fact that the demand for money in Turkey is explained very well by the

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[1]Allan H. Meltzer, "The Demand for Money: The Evidence from the Time Series," Journal of Political Economy, Vol. 71, June 1963, p. 222.

permanent income variable and the cost of holding money. The demand for money function is estimated from annual observations based on the availability of data.

What we have seen is that economic agents make decisions as to whether to hold money or other assets subject to the income constraint and the cost of holding money. The high rate of credit and money supply by the Central Bank in the early 1950's generated a high rate of inflation. This in turn reduced the demand for money balances and raised the upward trend of velocity from 1956 up to 1963.

The first Five-Year Plan was implemented in 1963. This gave confidence to the people. Relatively, we had a low rate of money supply and a low rate of inflation; as a result, the economic agents were trying to substitute money for other assets and the velocity showed a decline up to 1969. Nevertheless, as is explained in Chapter III in detail, the Central Bank again started to print money and to give credit to the State Economic Enterprises in order to fulfill the plan requirements.

Furthermore, in the mid-1960's the foreign exchange remittances from workers abroad constituted one of the causes of increase in money supply. What happened was that the Central Bank printed money and exchanged it with the workers' remittances. As a result of these policies, the high rate of supply of money in the hands of the public started to be accumulated at a faster rate than usual. The peasants of

Anatolia, who have worked in Germany, wanted to buy goods and services as they became better off in comparison to their neighbors. Prices started to rise as the public decided to spend more and to hold less money in its sight-demand accounts. As a consequence, desired money balances, relatively, started to fall and inflation showed a rapid rise. With inflation, the velocity tended to rise, and this supports the contentions of the economists who have stated that changes in price level is one of the important variables affecting the velocity of money, causing it to rise if the rate of inflation accelerates and fall if the rate of inflation decelerates.[1]

One of the results of the higher rate of money supply in the Turkish economy is that it is matched with a higher rate of consumption. The ratio of total consumption to income, instead of declining, gradually tended to rise. It is a point against the goals of the policy makers who had planned to decrease the ratio of total consumption to income and to increase the share of investment for economic growth.

One of the significant aspects of our analysis is that the coefficient of the change in price level or the rate of change in price level becomes more statistically significant as the rate of inflation increases. In other words, the

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[1]M. Friedman, "The Quantity of Money--A Restatement," in M. Friedman, ed., Studies in the Quantity Theory of Money; Reuben A. Kessel and Armen A. Alchian, "Effects of Inflation," Journal of Political Economy, Vol. 70, 1962, pp. 521-37.

impact of the change in price level on the real balances accelerates with the rapid rate of inflation and causes a decline in the ratio of money to GNP. It suggests that people's behavior of holding assets during inflationary period is different from that of a non-inflationary period. A great deal of substitution occurs between money and other assets.

Another point is that changes of institutional arrangements have noticeable effects on the coefficient of the cost of holding money. Lowering or holding interest rates constant on time and saving deposits lowers the coefficient of the cost of holding money of M_2 relative to M_1. As a result, time and saving deposits (T), with an increasing rate of inflation, lost its attractiveness as "money" for "transaction" purposes.

Furthermore, a lower ratio of money to GNP implies that the monetization of the economy is low and the multiplier of the final effect of monetary policy on the economy is larger.[1] Nevertheless, the impact of the monetary policy aimed at higher growth in real income declines with the rate of monetary expansion. However, the effect of a printing-money tax as a stimulus to real output becomes a self-defeating policy by (a) causing a high rate of inflation (it is 50 percent in 1978); (b) preventing the workers from

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[1]Phillip Cagan and Anna J. Schwartz, "Has the Growth of Money Substitutes Hindered Monetary Policy?," Journal of Money, Credit and Banking, Vol. 7, May 1975, p. 156.

sending the needed foreign exchange; (c) worsening the balance of payments deficits; (d) creating widespread economic dislocation, inefficiency and price controls; (e) increasing substitution from money to other assets, thus raising the ratio of consumption to income; (f) genetrating land speculation; and (g) imposing great harm on the political fabric of the society. Hence, as Figure 1 and Appendices 4-1 through 4-10 show inflation in Turkey is a monetary phenomenon.

In conclusion, the economic evidence obtained implies that broad as well as restricted definitions of money yield a satisfactory demand for money function for the Turkish case. The stable demand function for money suggests that the high variations in the growth rate of the monetary aggregate is the prima facia evidence that the monetary policy of the country has been destabilizing. What the Turkish economy needs is a low rate of money growth for production, foreign trade and stabilization purposes--in Hume's words, in order to provide "the oil which renders the motion of the wheels more smooth and easy."[1]

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[1]David Hume, Writings on Economics, p. 33.

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APPENDICES

Appendix 3-1

Gross National Product by Kind of Economic Activity
at Factor Cost, at 1968 Prices (Billions of Turkish Liras)

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958
Industries											
Agriculture	16.3	14.1	15.6	18.7	20.5	22.3	19.2	21.0	22.1	23.5	25.7
Industry	3.9	3.8	4.2	4.3	4.8	5.6	6.2	6.8	7.5	8.6	8.8
Construction	1.6	1.9	2.1	2.3	2.7	3.3	3.6	3.9	3.6	4.5	4.1
Wholesale and Retail Trade	2.4	2.5	2.8	3.1	3.6	4.1	4.1	4.5	4.5	5.0	5.0
Transport and Communication	1.7	1.7	1.9	2.1	2.4	2.8	3.0	3.3	3.6	3.9	3.8
Banking and Insurance	.3	.4	.4	.4	.5	.6	.7	.8	.8	.9	1.1
Ownership of Dwellings	2.8	2.8	2.8	2.8	2.9	3.1	3.2	3.4	3.5	3.6	3.7
Business and Personal Services	1.7	1.6	1.8	2.0	2.2	2.4	2.4	2.6	2.7	2.9	3.1
Government Services	3.2	3.2	3.3	3.5	3.7	4.2	4.6	4.7	4.9	5.1	5.4
Gross Domestic Product at Factor Cost	33.9	31.9	34.8	39.2	43.3	48.4	46.9	51.0	53.2	58.0	60.7
Net Factor Income From Abroad	-.1	-.1	-.1	-.1	-.1	-.1	-.2	-.3	-.3	-.4	-.5
GNP at Factor Cost	33.9	31.8	34.7	39.1	43.2	48.3	46.7	50.8	52.9	57.6	60.2
(Less) Subsidies	.02	.001	.001	.03	.1	.03	.03	.03	.06	.4	.1
Indirect Taxes	3.2	3.4	3.8	4.4	5.5	5.9	5.8	5.9	5.6	5.8	5.8
GNP in Purchasers' Values	37.1	35.2	38.5	43.4	48.6	54.1	52.5	56.6	58.4	63.0	65.8

(1) Provisional estimates

Sources: Data from 1948 till 1971 is taken from National Income and Expenditure of Turkey (1948-1972), National Income and Expenditure of Turkey (1962-1973) State Institute of Statistics (Ankara, 1973, 1974); Data for the years 1972-1976 from Annual Report of Central Bank of Turkey, 1976 (Ankara, 1977), all estimated by the State Institute of Statistics.

Appendix 3-1 (continued)

1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972
25.7	26.3	25.0	26.3	28.8	28.7	27.6	30.5	30.5	30.9	31.3	32.6	36.8	36.1
9.1	9.2	10.4	10.6	11.8	13.1	14.4	16.6	17.9	20.2	22.4	23.1	25.4	27.1
4.1	4.3	4.2	4.5	4.9	5.4	5.6	6.4	6.6	7.3	7.5	8.2	7.8	8.3
5.8	5.9	6.2	6.7	7.5	8.0	8.5	9.8	10.4	11.4	12.3	12.8	14.4	17.0
4.2	4.4	4.5	5.0	5.5	5.8	6.2	7.3	7.4	8.5	9.2	9.9	10.7	12.4
1.1	1.2	1.2	1.3	1.4	1.5	1.5	1.7	1.9	2.2	2.4	2.6	2.8	3.0
3.7	3.9	3.9	4.1	4.2	4.4	4.5	4.7	4.9	5.1	5.4	5.7	6.1	6.2
3.2	3.3	3.3	3.5	3.9	4.0	4.1	4.6	4.8	5.2	5.5	5.7	6.3	6.7
5.7	6.3	6.7	7.1	7.7	7.8	8.3	8.8	9.4	10.1	10.7	11.5	12.2	12.9
62.6	64.7	65.6	69.0	75.7	78.9	80.8	90.4	93.8	100.9	106.6	112.0	122.6	129.7
-.9	-.5	-.3	-.3	-.1	-.2	.3	.6	.3	.3	.4	1.5	3.0	4.4
61.8	64.1	65.2	68.7	75.6	78.7	81.1	90.9	94.1	101.2	107.0	113.5	125.6	134.1
.1	.2	.4	.3	.4	.5	.4	.7	.4	.8	1.2	1.3	1.0	.9
6.9	6.9	7.4	8.4	9.0	9.3	9.7	11.0	11.8	12.1	12.7	13.0	14.0	15.3
68.5	70.9	72.3	76.8	84.2	87.6	90.3	101.2	105.5	112.5	118.6	125.2	138.6	148.5

Appendix 3-1 (continued)

1973	1974	1975	1976
32.4	35.8	39.7	41.2
30.2	32.7	35.6	39.7
9.0	9.5	10.3	11.2
18.9	21.0	23.1	25.2
13.9	15.1	16.3	18.3
3.3	3.6	3.9	4.1
6.6	7.0	7.5	8.0
7.0	7.6	8.3	8.9
13.7	14.6	15.5	16.6
135.0	146.9	160.0	173.2
6.0	4.8	3.6	2.2
141.1	151.6	163.7	175.4
1.0	1.1	1.1	1.7
16.4	17.5	19.0	20.8
156.5	168.0	181.5	194.5

Appendix 3-2

Central Government Expenditures, Tax Revenues, and Percentage Shares of Tax Revenues in Gross Domestic Product and Gross National Product From 1950 to 1973 at Current Prices in Producer's Values

Years	Central Government Expenditures (billions of Turkish Liras)	Tax Revenues	Tax Revenues as Percentages of GDP	Tax Revenues as Percentages of GNP
1950	1.300	1.312	11.9	11.9
1951	N.A.	N.A.	10.1	10.1
1952	N.A.	N.A.	11.0	11.0
1953	2.148	1.971	10.9	10.9
1954	2.507	2.222	12.1	12.1
1955	3.172	2.627	11.7	11.7
1956	3.455	2.999	11.6	11.7
1957	3.965	3.821	10.2	10.3
1958	4.887	4.430	10.1	10.1
1959	6.568	5.928	11.5	11.5
1960	7.204	6.096	11.0	11.0
1961	8.447	7.187	12.1	12.2
1962	8.940	7.625	11.0	11.1
1963	10.924	9.291	11.7	11.7
1964	12.483	10.060	11.9	12.0
1965	13.462	11.205	12.8	12.7
1966	16.008	13.388	13.1	13.0
1967	18.179	16.786	13.8	13.7
1968	20.894	17.567	13.8	13.8
1969	23.907	21.789	14.9	14.9
1970	26.247	24.599	15.9	15.6
1971	33.447	30.387	16.8	16.3
1972	43.968	45.319	17.0	16.4
1973			19.7	16.8

(1) General Taxes

Sources: Tax Revenues as percentage of GDP and GNP from Budget Revenues Yearbook, 1974 Ministry of Finance-Department of Revenues (Ankara), 1974; Central Government expenditures and Tax Revenues from Anne O. Krueger, Foreign Trade Regimes and Economic Development: Turkey; and National Accounts of OECD Countries (1975).

Appendix 3-3
Balance of Payments (Million US $)

	1950	1951	1952	1953	1954	1955	1956	1957	1958
CURRENT ACCOUNT									
Foreign Trade									
Imports (cif)	-286	-402	-556	-533	-478	-498	-407	-397	-315
Exports (fob)	263	314	363	396	335	313	305	345	247
Trade Balance	-23	-88	-193	-137	-143	-185	-102	-52	-68
Invisibles									
Tourism and Travel, net	-6	-1	-7	-9	-10	-7	-9	-9	-8
Interest /1	-15	-10	-12	-18	-18	-21	-16	-14	-8
Profit Transfers	--	--	--	--	--	--	-5	-7	-4
Workers Remittances	--	--	--	--	--	--	--	--	--
Others (net)	-6	5	14	--	-6	-7	-10	-17	-28
Invisible Balance	-27	-6	-5	-27	-34	-35	-40	-47	-48
NATO infrastructure and off-shore receipts	--	--	--	--	--	43	67	40	52
Current Account Balance	-50	-94	-198	-164	-177	-177	-75	-59	-64
CAPITAL ACCOUNT									
Private Resources	2	28	95	113	134	130	145	104	58
Suppliers Credits	--	21	4	64	104	127	98	66	45
Direct Investment	2	7	10	8	8	3	2	17	13
Direct Imports (with waivers)	--	--	--	--	--	--	--	--	--
Commercial credits	--	--	81	41	22	--	45	21	--
Official	103	113	72	62	65	81	103	75	105
Project Assistance	5	1	6	11	14	15	8	5	4
Program Assistance: EMA Credits	--	--	--	--	--	--	--	--	4
: Others	98	112	66	51	51	66	95	70	97
Debt relief	--	--	--	--	--	--	--	--	--
EMA Refinancing	--	--	--	--	--	--	--	--	--
T.L. Grain imports and grants	--	--	--	--	--	--	14	32	42
Gross Capital Inflow	105	141	167	175	199	211	262	211	205
Amortization of Public Debt	-15	-18	-22	-20	-73	-105	-89	-83	-69
Net Capital Inflow	90	123	145	155	126	106	173	128	136
Overall Balance	40	29	-53	-9	-51	-71	98	69	74
Net IMF position	--	--	5	20	-6	-9	--	7	17
SDR's	--	--	--	--	--	--	--	--	--
Short term capital (net)	2	3	11	10	57	61	-15	-11	-7
Errors and omissions	-12	-11	-62	48	-66	-52	-45	-58	+17
Changes in reserves (- increase)	-30	-21	99	-69	66	71	-38	-7	-67

Appendix 3-3 (continued)

1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
-470	-468	-510	-622	-688	-537	-572	-718	-685	-764	-801	-948	-1171
354	321	347	381	368	411	464	490	523	496	537	588	677
-116	-147	-163	-241	-320	-126	-108	-228	-162	-268	-264	-360	-494
-6	-2	-5	-10	-13	-14	-10	-14	-14	-9	-5	4	21
-22	-29	-30	-30	-32	-34	-32	-31	-35	-41	-45	-47	-60
-4	-2	-1	-2	1	-5	-15	-16	-25	-32	-32	-33	-36
--	--	--	--	--	9	70	115	93	107	141	273	471
-32	-11	-19	1	15	2	-3	-9	15	2	-24	-16	-30
-64	-44	-55	-41	-29	-42	10	45	34	27	35	181	366
35	52	48	40	49	59	20	19	14	10	8	8	6
-145	-139	-170	-242	-300	-109	-78	-164	-114	-231	-221	-171	-122
35	54	49	62	36	42	27	41	29	35	44	92	72
28	30	15	26	10	10	--	--	--	--	--	--	--
7	24	34	36	21	25	22	30	17	13	24	58	45
--	--	--	--	5	7	5	11	12	22	20	34	27
--	--	--	--	--	--	--	--	--	--	--	--	--
169	118	151	163	247	190	274	238	246	274	279	337	343
1	2	7	26	81	40	57	56	83	127	174	179	219
21	1	50	45	35	20	--	--	25	25	15	25	15
147	115	94	92	104	106	132	111	92	87	79	67	59
--	--	--	--	27	14	38	52	46	35	11	16	13
--	--	--	--	--	10	50	20	--	--	--	50	37
27	22	65	71	88	31	29	17	--	--	41	83	55
231	194	265	296	371	263	330	296	275	309	364	512	470
-60	-65	-84	-97	-101	-114	-170	-124	-106	-94	-115	-197	-125
171	129	181	199	270	149	160	172	169	215	249	315	345
26	-10	11	-43	-30	40	82	8	55	-16	28	144	223
-3	-3	10	6	4	3	-15	--	7	27	-11	48	-3
--	--	--	--	--	--	--	--	--	--	--	--	5
-10	-18	-39	-15	--	--	--	--	7/2	18/2	29/2	18/2	61/2
44	82	97	22	-22	-80	-67	-18	-81	-25	76	-24	60
31	-51	-79	30	48	37	--	10	12	-4	-122	-186	-346

/1 Gross of debt relief.
/2 Inflows on convertible lira accounts.
/3 Provisional

* Gross short term capital

Source: Ministry of Finance, reported in Turkey: Prospects and Problems of an Expanding Economy and Annual Report of Central Bank (1976).

Appendix 3-3 (continued)

1972	1973	1974	1975	1976(3)
-1563	-2099	-3778	-4739	-5129
885	1317	1532	1401	1960
-678	-782	-2246	-3338	-3169
44	79	42	46	-27
-62	-59	-102	-124	-217
-35	-35	-71	-36	-83
740	1183	1426	1312	983
-47	69	205	237	213
640	1237	1500	1435	869
30	19	27	23	15
-8	474	-719	-1880	-2285
82	129	146	251	163
--	--	--	--	--
--	--	--	--	--
43	79	88	153	27
39	50	58	98	136
--	--	--	--	--
295	376	269	386	503
222	328	267	381	497
73	48	2	5	6
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
18	--	--	--	--
395	505	415	637	666
-235	-72	-126	118	-119
160	433	289	519	547
152	907	-430	-1361	-1738
-19	--	-8	301	149
413*2	224*2	60*2	666*2	1520*2
18	45	-53	-23	-50
-564	-728	431	417	119

Appendix 3-4

Maximum Lending Interest Rates (In annual percentages)

	1961	1970
I. Short-term Credits		
A. General Interest Rate	10.5	11.5
B. Differential Interest Rates		
1. People's bank credit to artisans and small businesses	9.0	10.5
2. Agricultural credits:		
a. General Rate	9.0	10.5
b. From proceeds of Agriculture Bank's bonds	5.0	3.0
3. Export credits: /2		
a. General Rate	9.0	10.5
b. If rediscounted with Central Bank	---	9.0
4. Preferred Industrial Credits	---	10.5
II. Medium-term Credits		
A. General Interest Rate	10.5	12.0
B. Differential Interest Rates		
1. People's bank credit to artisans and small businesses	9.0	12.0
2. Agricultural credits	7.0	10.5
3. Export credits: /2		
a. General Rate	9.0	12.0
b. If rediscounted with Central Bank /3	---	12.0
4. Credits to sectors (except the agricultural sector) specified in the General Schedule of Encouragement of the Annual Program /4	---	12.0
III. Central Bank Rediscount		
1. General Rediscount Rate	7.5	9.0
2. Credits for exports, small businesses and artisans, preparation and manufacturing of exports subject to certificates, agriculture	5.25	7.5
3. Bills of priority industry branches	----	7.5
4. Medium-term credits:		
a. General	----	9.0
b. Exports, as specified in Annual Program	----	---
c. Agricultural credits	----	---
5. Advances against bonds	10.0	11.0
6. Advances against gold	6.0	7.0
IV. State Investment Bank Lending Rate	----	9-10.5
V. Bond Rates		
1. Government long-term bonds	6.0	9.0
2. Private corporations	----	15.0

(1) Effective in March, 1976.

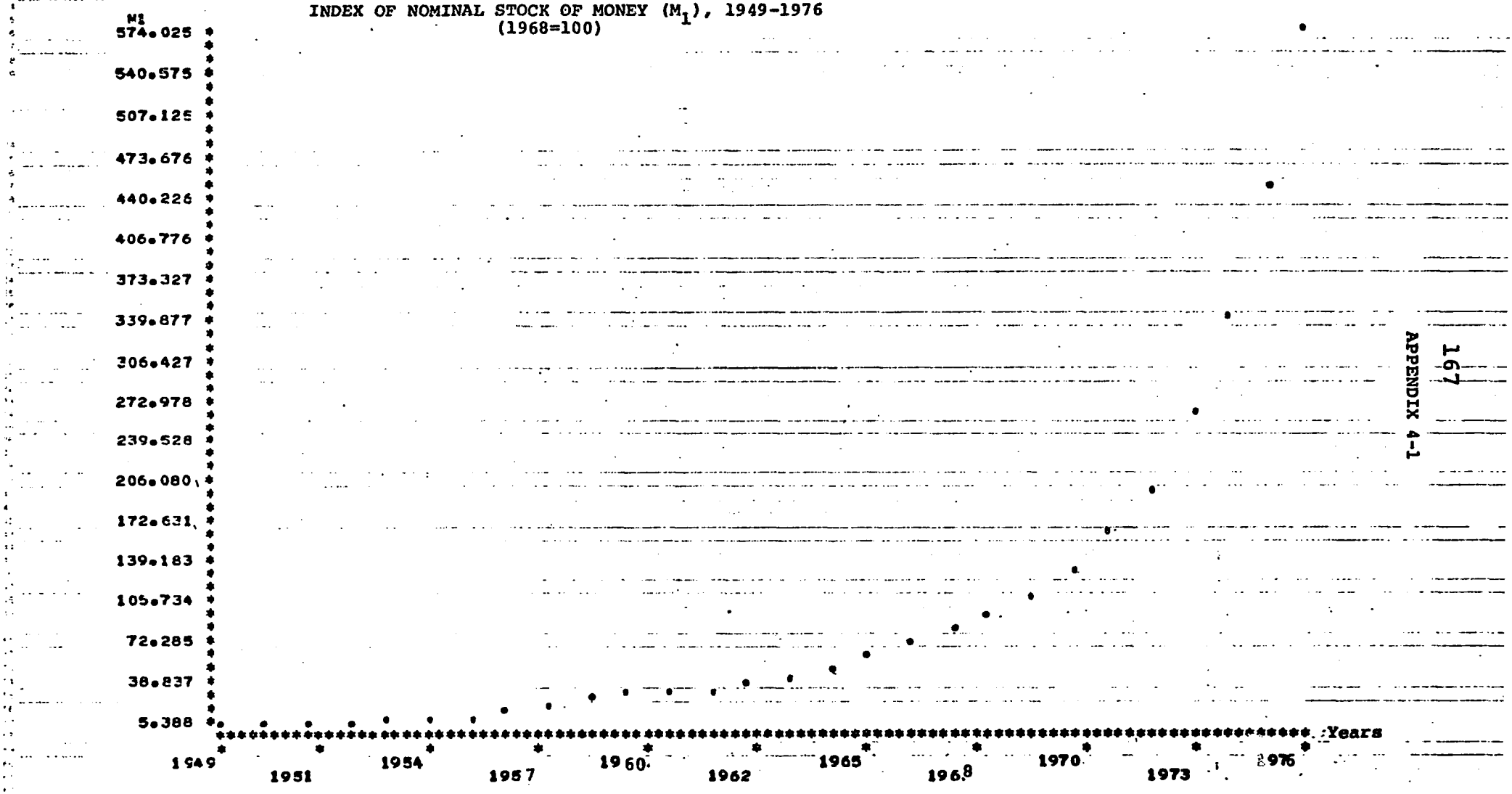
Source: Ministry of Finance, reported in Turkey: Prospects and Problems of an Expanding Economy, Monthly Bulletin and Annual Report of Central Bank, different issues.

Appendix 3-4
(continued)

1973	1974
10.5	11.5
9.0	10.5
9.0	10.5
3.0	3
9.0	10.5
7.5	9.0
10.5	
12.0	14
9.0	10.5
9.0	10.5
12.0	10.5
10.5	9.0
12.0	9
8.75	9
7.0	10.5
8	8
9.0	10.5
---	----
7.0	8
11.0	11
7.0	7
9.5-10.5	11 (1)
9.0	11 (1)
15.0	18 (1)

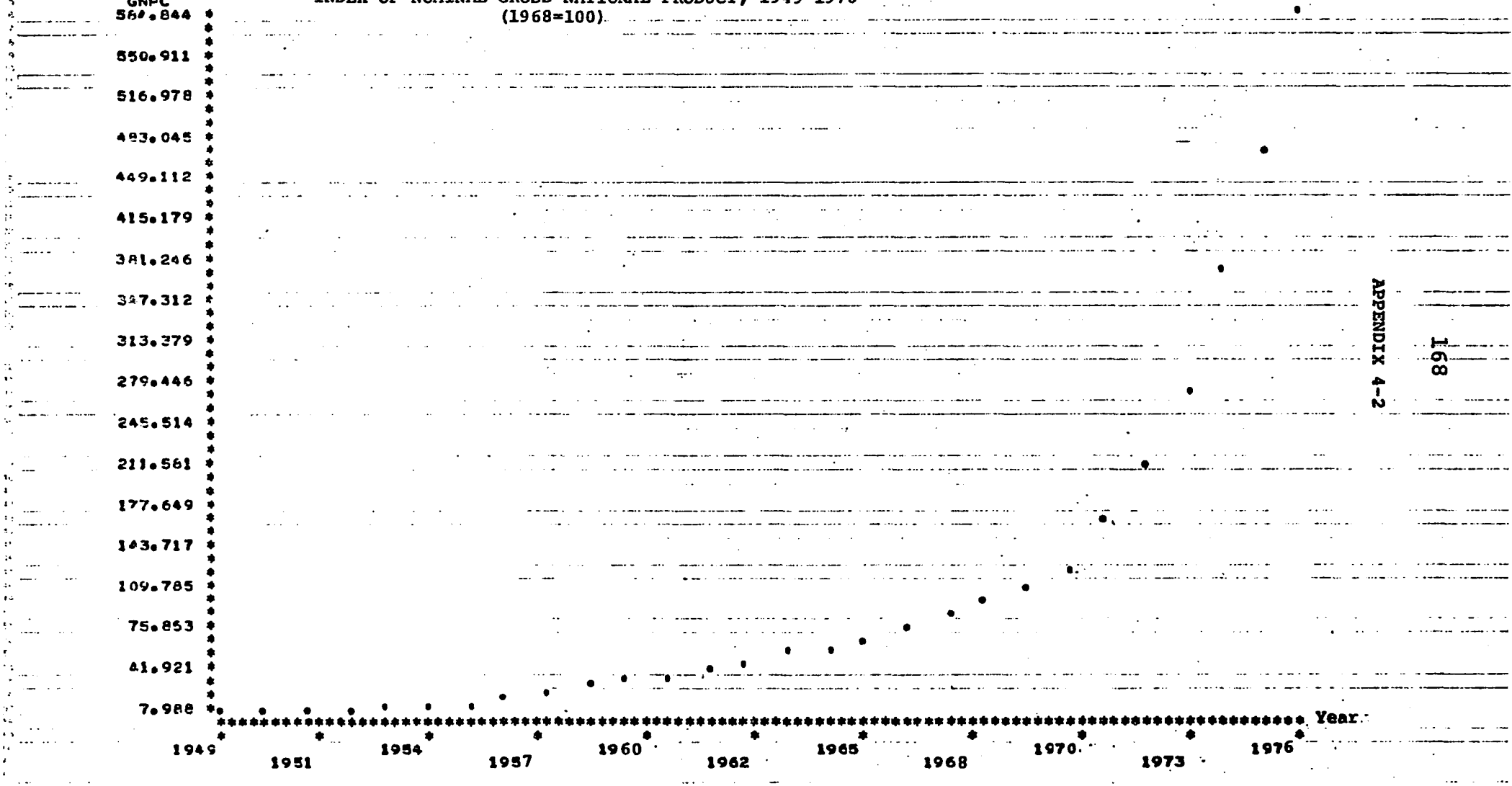
TIME SERIES PROCESSOR VERSION 2.8A JAN.. 1977 IBM 370 3/30/78 22:55

INDEX OF NOMINAL STOCK OF MONEY (M_1), 1949-1976
(1968=100)



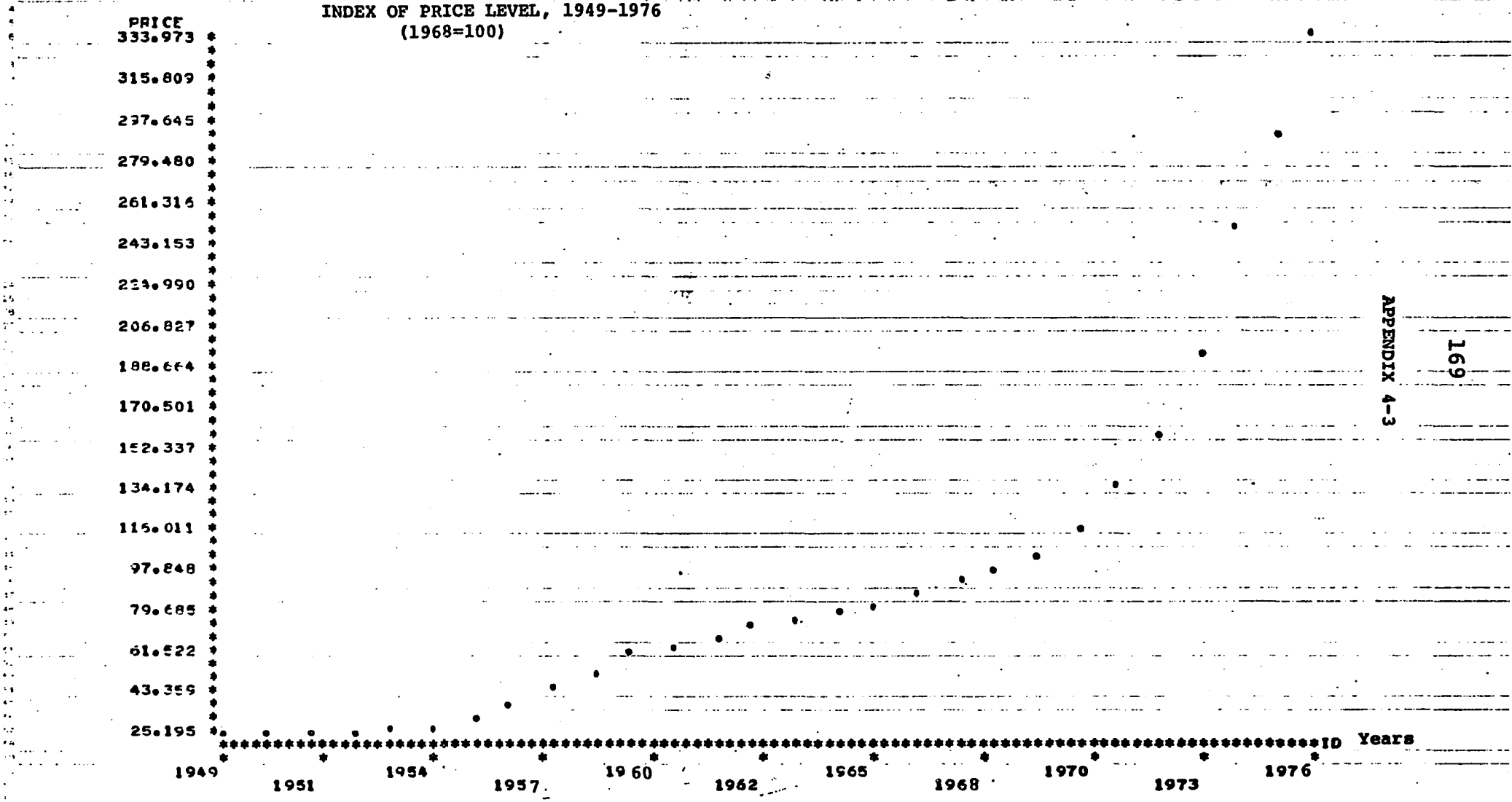
TIME SERIES PROCESSOR VERSION 2.8A JAN. 1977 IBM 370 3/31/78 19:47

INDEX OF NOMINAL GROSS NATIONAL PRODUCT, 1949-1976
(1968=100)



TIME SERIES PROCESSOR VERSION 2.0A JAN., 1977 IBM 370 3/31/76 19:47

INDEX OF PRICE LEVEL, 1949-1976
(1968=100)

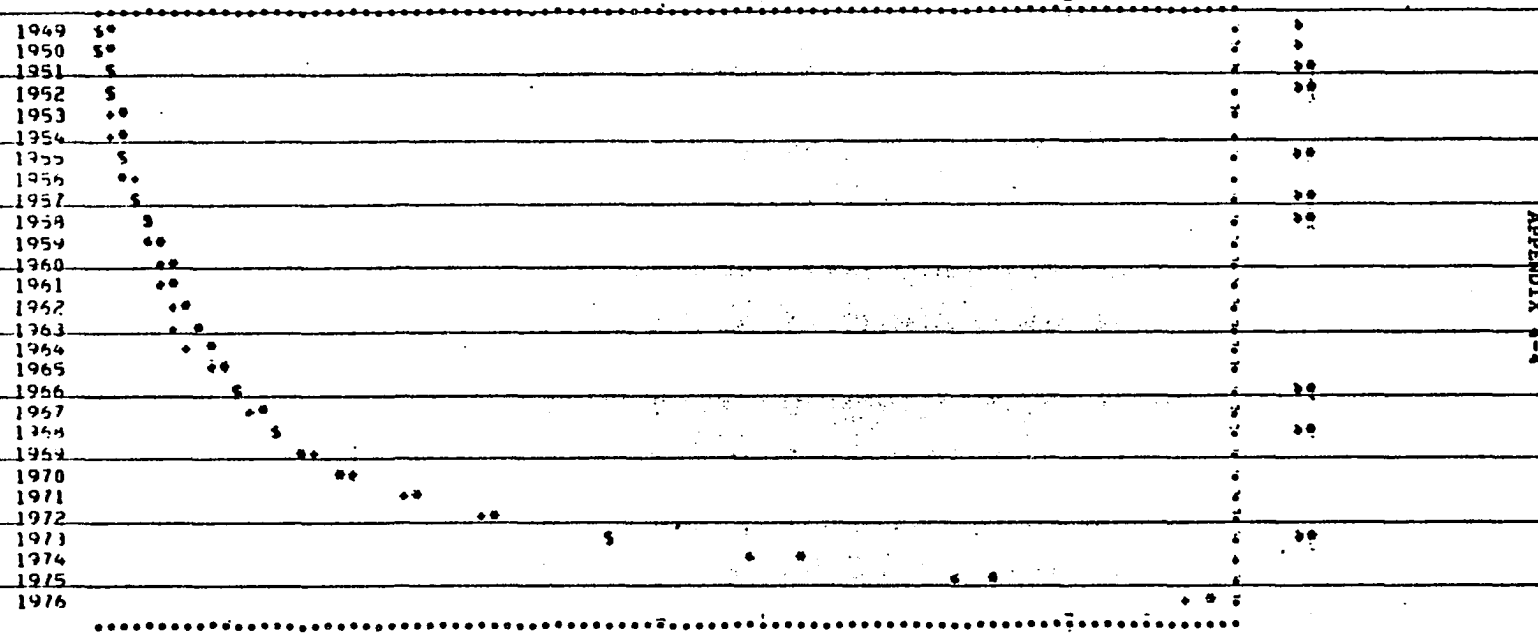


TIME SERIES PROCESSOR VERSION 2.0A JAN. 1977 IBM 370 3/29/78 13:46

GNPC PLOTTED WITH ($)
M1 PLOTTED WITH (*)

POINTS EXCEEDING THE SCALE OF THE GRAPH AND POINTS WHERE TWO OR MORE VARIABLES HAVE THE SAME VALUE WILL BE PLOTTED WITH ($). THE VARIABLE CONCERNED WILL BE INDICATED ON THE FAR RIGHT HAND SIDE OF THE GRAPH.

MINIMUM= 0.0 MAXIMUM= 590.499756



INDEX OF NOMINAL STOCK OF MONEY (M_1) AND NOMINAL GROSS NATIONAL PRODUCT, 1949-1976
(1968=100)

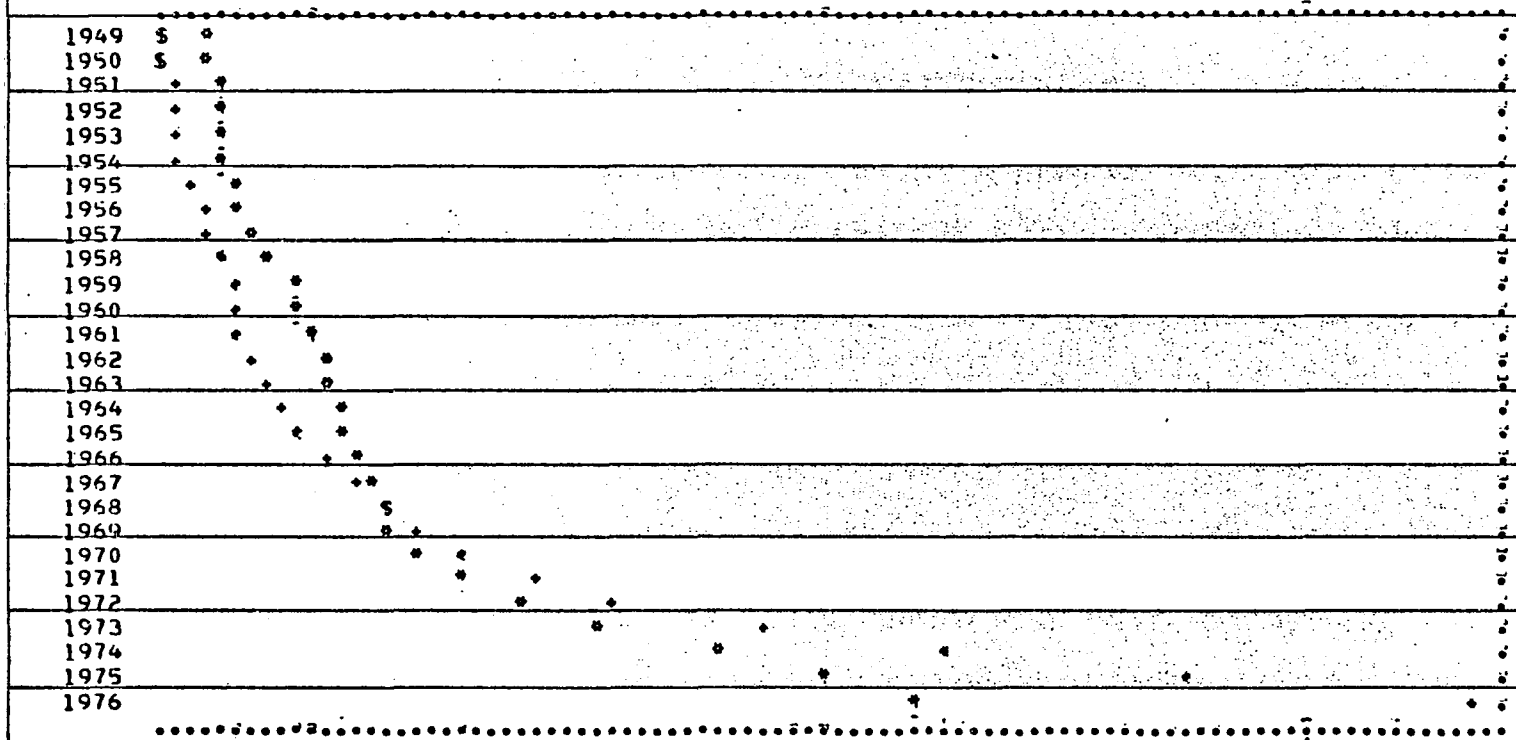
APPENDIX A-4

TIME SERIES PROCESSOR VERSION 2.8A JAN 1977 IBM 370 3/29/78 1314

PRICE PLOTTED WITH (*)
M1 PLOTTED WITH (+)

POINTS EXCEEDING THE SCALE OF THE GRAPH AND POINTS WHERE TWO OR MORE VARIABLES HAVE THE SAME VALUE WILL BE PLOTTED WITH ($). THE VARIABLE CONCERNED WILL BE INDICATED ON THE FAR RIGHT HAND SIDE OF THE GRAPH.

MINIMUM= 0.0 MAXIMUM= 579.599894



INDEX OF PRICE LEVEL AND NOMINAL STOCK OF MONEY, 1949-1976

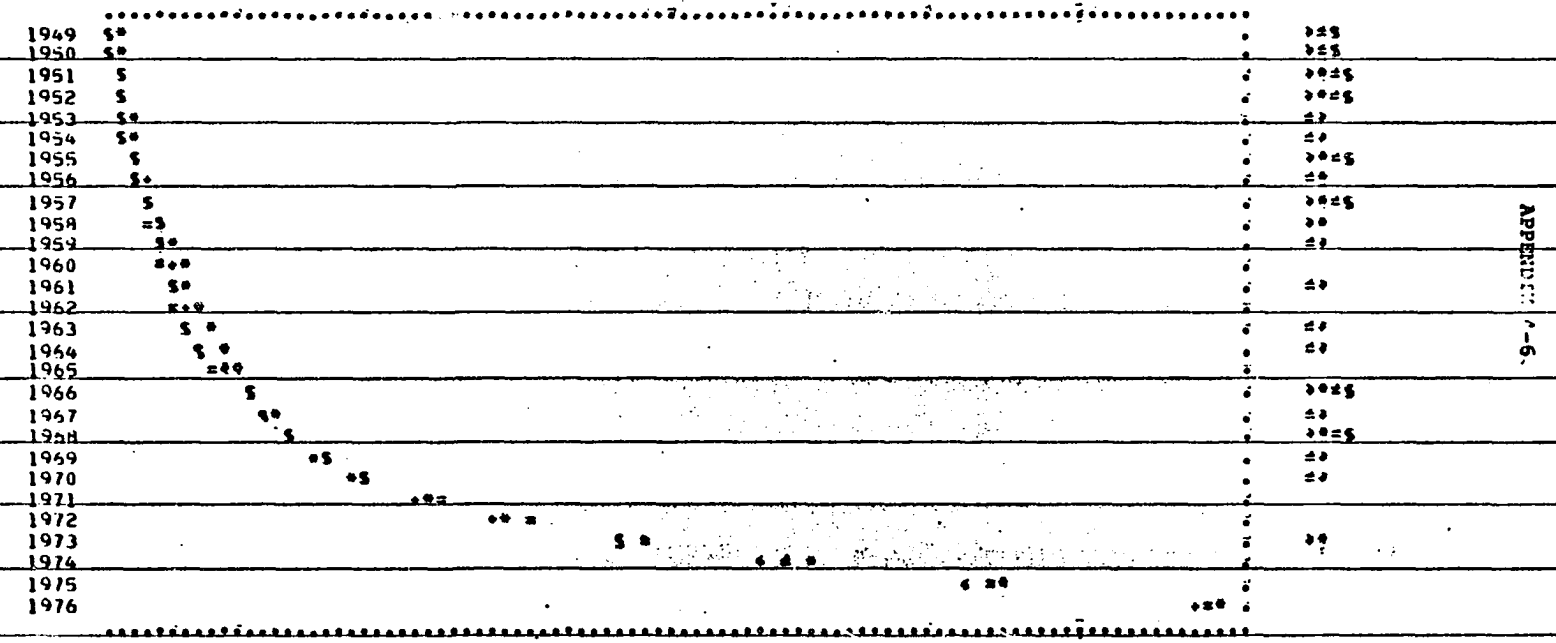
(1968=100)

TIME SERIES PROCESSOR VERSION 2.0A JAN=0 1977 IBM 370 3/29/78 13:46

GNPC PLOTTED WITH 0*0
M1 PLOTTED WITH 0$0
M2 PLOTTED WITH 0=0

POINTS EXCEEDING THE SCALE OF THE GRAPH AND POINTS WHERE TWO OR MORE VARIABLES HAVE THE SAME VALUE WILL BE PLOTTED WITH (0). THE VARIABLE CONCERNED WILL BE INDICATED ON THE FAR RIGHT HAND SIDE OF THE GRAPH.

MINIMUM= 0.0 MAXIMUM= 590.499756



INDEX OF NOMINAL GROSS NATIONAL PRODUCT, NOMINAL STOCK OF MONEY (M_1) AND (M_2), 1949-1976
(1968=100)

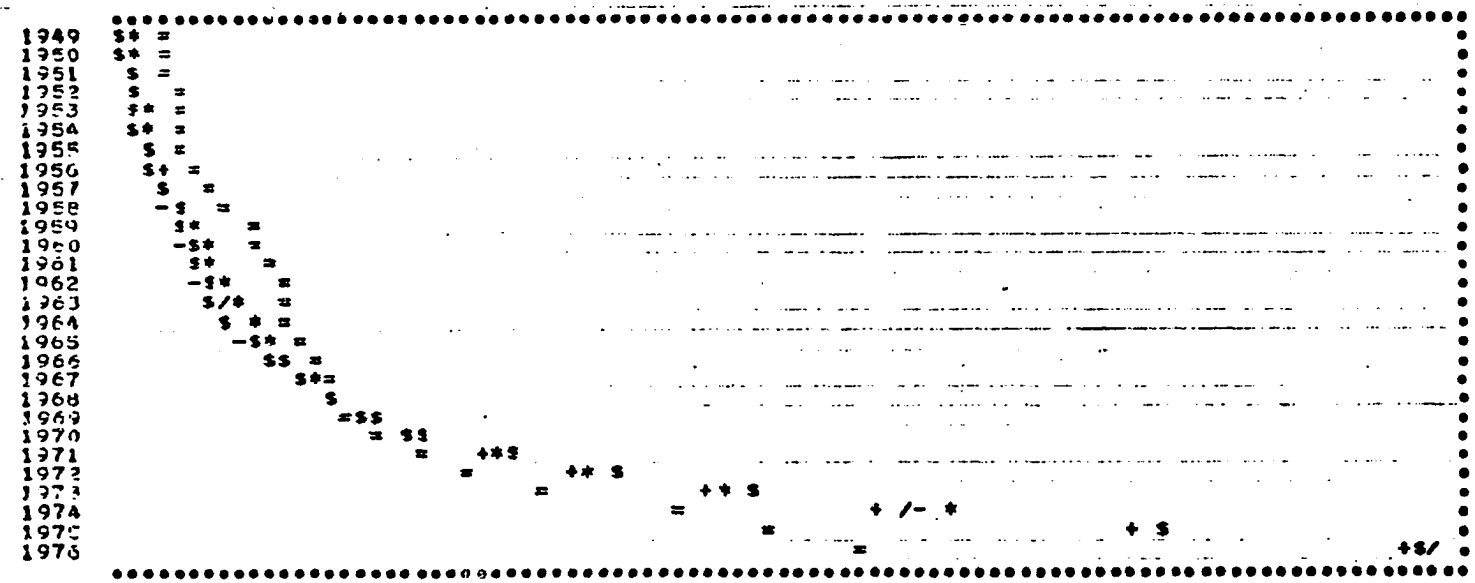
APPENDIX A-6.

TIME SERIES PROCESSOR VERSION 2.8A JAN.. 1977 IBM 370 3/31/78 19:47

GNPC PLOTTED WITH (*)
M1 PLOTTED WITH (+)
M2 PLOTTED WITH (-)
M3 PLOTTED WITH (/)
PRICE PLOTTED WITH (=)

POINTS EXCEEDING THE SCALE OF THE GRAPH AND POINTS WHERE TWO OR MORE VARIABLES HAVE THE SAME VALUE WILL BE PLOTTED WITH ($). THE VARIABLE CONCERNED WILL BE INDICATED ON THE FAR RIGHT HAND SIDE OF THE GRAPH.

MINIMUM= 0.0 MAXIMUM= 592.000000



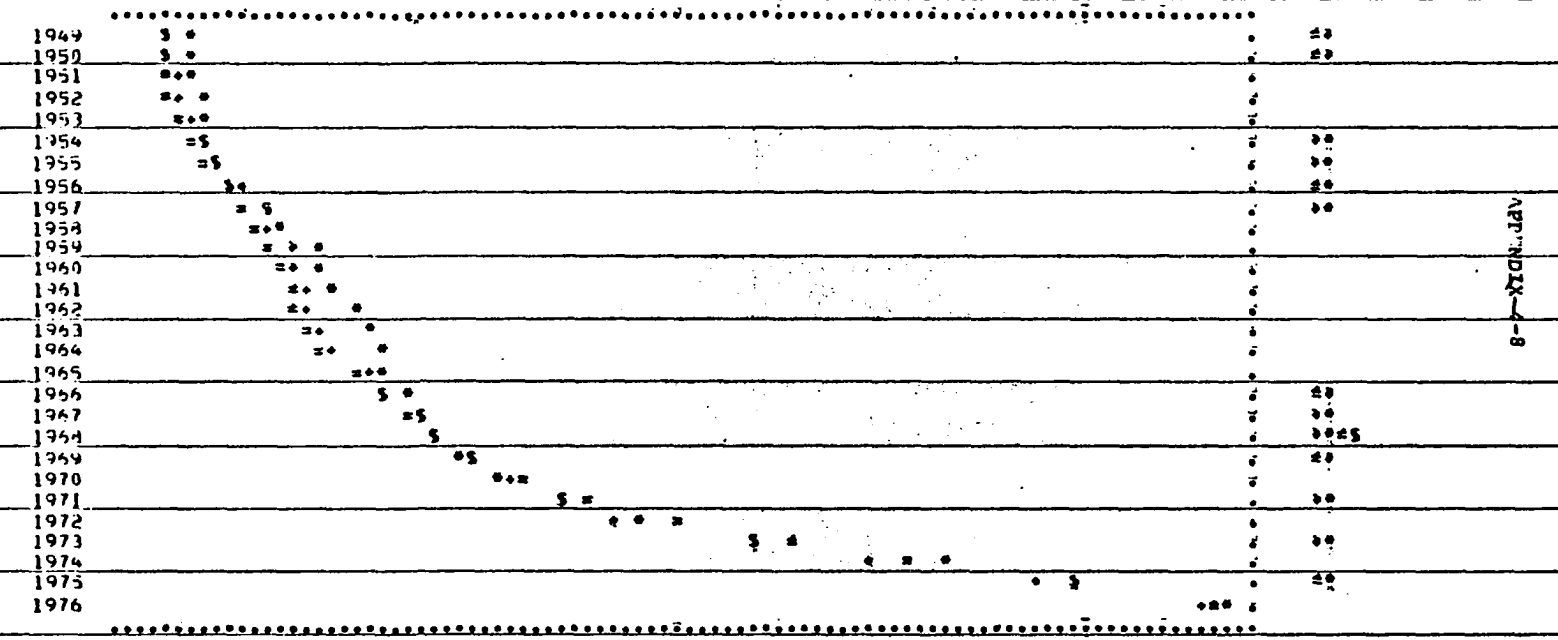
INDEX OF NOMINAL GROSS NATIONAL PRODUCT, THREE DEFINITIONS OF NOMINAL STOCK OF MONEY, AND PRICE LEVEL, 1949-1976
(1968=100)

TIME SERIES PROCESSOR VERSION 2.0A JAN 1977 IBM 370 3/29/78 13:46

PRICE PLOTTED WITH (*)
M1GNP68 PLOTTED WITH (F)
M2GNP68 PLOTTED WITH (S)

POINTS EXCEEDING THE SCALE OF THE GRAPH AND POINTS WHERE TWO OR MORE VARIABLES HAVE THE SAME VALUE WILL BE PLOTTED WITH ($). THE VARIABLE CONCERNED WILL BE INDICATED ON THE FAR RIGHT HAND SIDE OF THE GRAPH.

MINIMUM= 0.0 MAXIMUM= 337.000000

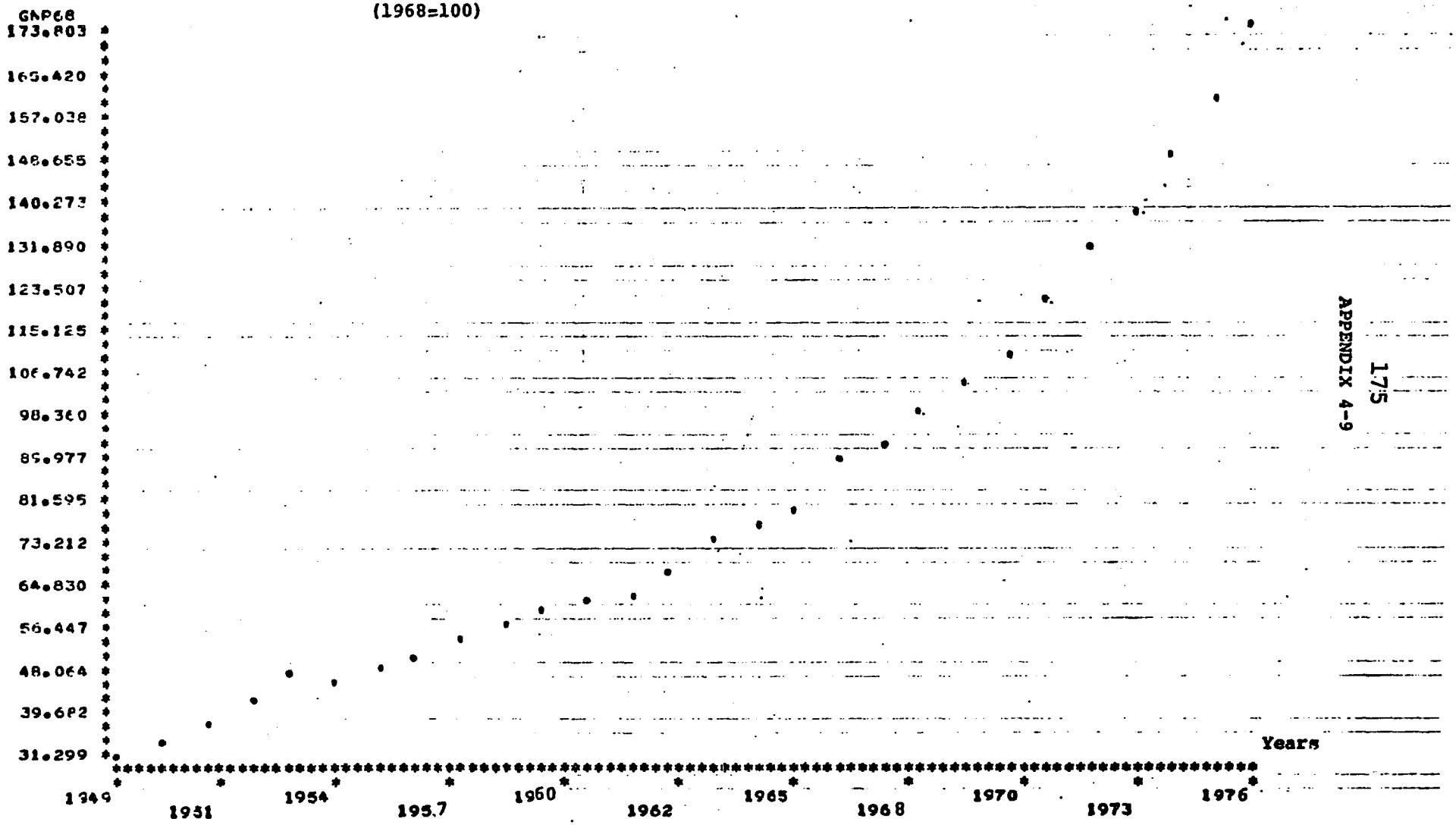


INDEX OF PRICE LEVEL, MONEY (M_1) PER CAPITA OUTPUT, AND MONEY (M_2) PER CAPITA OUTPUT (M2GNP68), 1949-1976
(1968=100)

APPENDIX 4-8

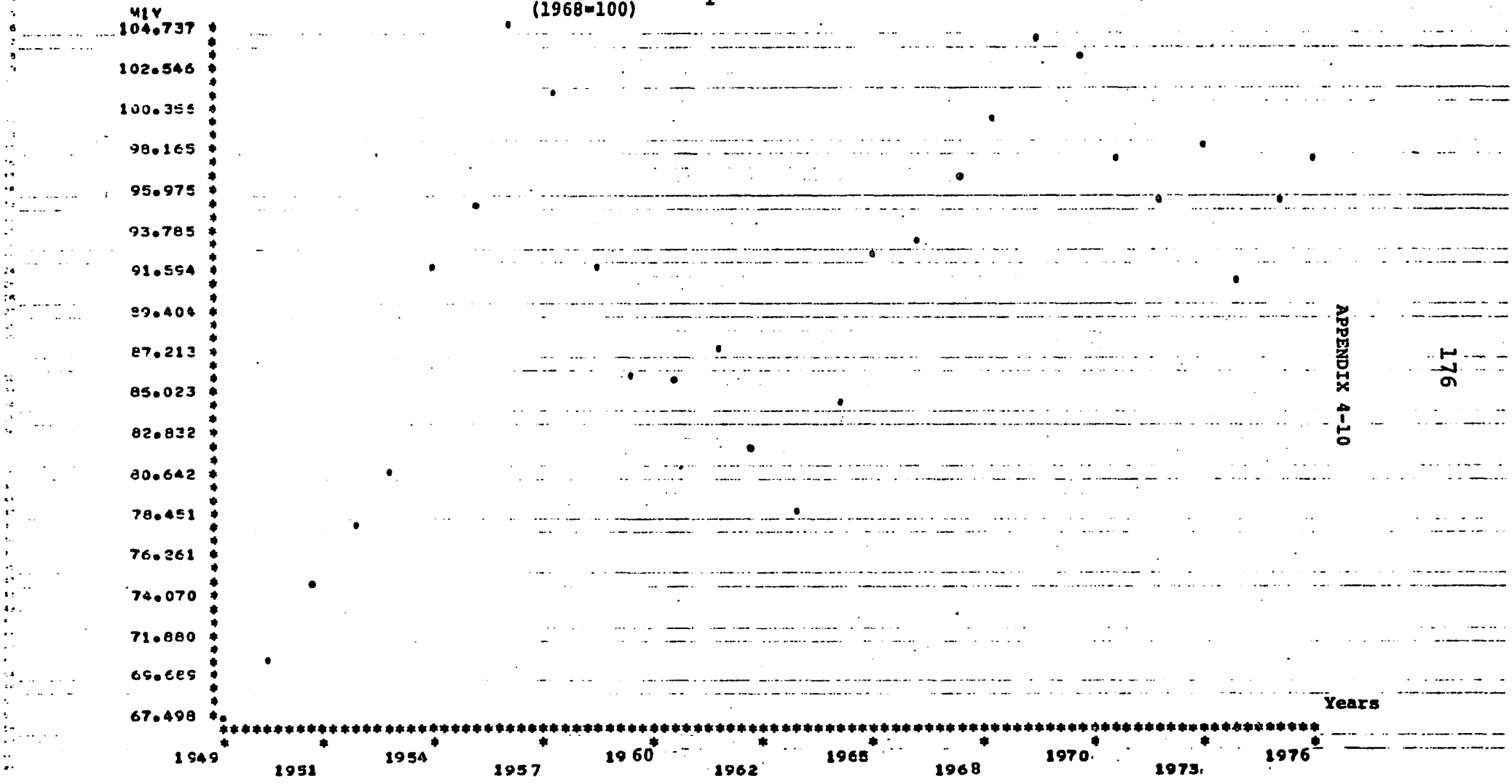
TIME SERIES PROCESSOR VERSION 2.8A JAN.. 1977 IBM 370 3/31/78 19:47

INDEX OF REAL INCOME, 1949-1976
(1968=100)



TIME SERIES PROCESSOR VERSION 2.8A JAN.. 1977 IBM 370 3/31/76 19:47

INDEX OF RELATIVE STOCK OF MONEY (M_1/Y), 1949-1976
(1968=100)



APPENDIX 4-10